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ABSTRACT

ATTITUDE, SUBJECTIVE NORM, AND PERCEIVED BEHAVIORAL CONTROL
AS INDICATORS FOR NURSE EDUCATORS' INTENTION TO USE
CRITICAL THINKING TEACHING STRATEGIES: A
STRUCTURAL EQUATION MODEL ANALYSIS

by

Angerlita Yolanda Smith

Chair: Raymond Ostrander

ABSTRACT OF GRADUATE STUDENT RESEARCH

Dissertation

Andrews University

School of Education

Title: ATTITUDE, SUBJECTIVE NORM, AND PERCEIVED BEHAVIORAL
CONTROL AS INDICATORS FOR NURSE EDUCATORS' INTENTION TO
USE CRITICAL THINKING TEACHING STRATEGIES: A STRUCTURAL
EQUATION MODEL ANALYSIS

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Date completed: July 2015

Problem

Deficiencies in new nursing graduates' ability to use critical thinking skills have been documented. Researchers have found that the continued use of traditional teaching methods and less student-centered approaches for critical thinking development has contributed to this problem. This particular issue has evoked much concern for institutions and organizations involved with the safe delivery of patient care. The

purpose of this study was to examine (a) the relationship between the factors educator characteristics, attitude, subjective norm and perceived behavioral control in a hypothesized model that may influence nurse educators' intention to use instructional methods that promote critical thinking in this study referred to as evidence-based critical thinking (EBCT) teaching strategies for critical thinking development in baccalaureate nursing students and (b) the relationship between intention to use EBCT teaching strategies and actual use.

Method

A quantitative, non-experimental correlation survey and cross-sectional design was used to analyze the data in this study. An online survey was used to collect 244 responses from nurse educators who taught in 4-year degree nursing programs in the southeast region of the United States. The Statistical Package for Social Sciences Software (SPSS) and Structural Equation Modeling (SEM) with Analysis of a Moment Structures (AMOS) were used to analyze the data, test the hypothesized model, and provide descriptive statistics, correlations, and model fit results. One main research question and null hypothesis as well as five sub-questions and null sub-hypotheses were tested in this study.

Results

Results from the analysis of the hypothesized model showed that the initial model did not fit the observed data. However, an adjusted model provided an acceptable fit to the data ($\chi^2 = 398$, $\chi^2/df = 1.51$, $GFI = 0.88$, $CFI = 0.92$, $TLI = 0.91$, $RMSEA = 0.05$). Educator characteristics did not contribute to the initial or adjusted model due to non-significant loadings on the items. Attitude towards use of EBCT teaching strategies had a strong significant positive direct effect on intention to use ($\beta = .95$, $p < .05$) and accounted for 90% of the variance in intention to use; subjective norm indicated a significant weak negative effect on intention to use EBCT teaching strategies ($\beta = -.12$, $p = .03$). No statistically significant relationship was found between perceived behavioral control and intention to use EBCT teaching strategies ($\beta = -0.03$, $p = 0.54$). There was a statistically significant relationship between intention to use EBCT teaching strategies and actual use ($\beta = 0.30$, $p = 0.01$). While this was a significant finding, the number of nurse educators who rarely or never used any of the critical thinking teaching strategies addressed in this study warrants attention. Together, all three predictors (attitude, subjective norm, and perceived behavioral control) explained 77% of the variance in intention to use EBCT teaching strategies. Correlations between the latent factors showed that attitude had a positive strong correlation with subjective norm and a weak negative correlation with perceived behavioral control. The correlation between subjective norm and perceived behavioral control was weak and negative.

Conclusions

Overall, the relationships between the factors attitude, subjective norm, and perceived behavioral control and intention to use critical thinking teaching strategies partially supported the hypothesized effects based on the theory of planned behavior. As expected, attitude towards use of EBCT teaching strategies emerged as the stronger factor to influence intention to use, meaning that nurse educators in this study strongly valued the use of critical thinking teaching strategies that are evidence-based and had a positive attitude towards use. On the other hand, although subjective norm had a significant influence on intention to use, the effect was negative. Approval from others was important; however, social pressure was not perceived as having a positive relationship with intention to use EBCT teaching strategies. Perceived behavioral control was not a significant contributor to intention because issues of controllability and ability did not seem to be a factor affecting intention to use EBCT teaching strategies.

Confirmation of some of the theoretical relationships in the hypothesized model validates the usefulness of the TPB in analyzing factors that may influence nurse educators' intention to use and actual use of critical thinking teaching strategies. On the basis of the results, this study recommends among other actions the addition of a critical thinking instruction course to nurse educator preparation programs in order to facilitate critical thinking development in nursing students for preparation to practice.

Professional learning communities should be established that will address educators'

professional needs as a response to the ongoing call to transform nursing education.

Finally, the study presents suggestions for further research and implications for nursing education.

Andrews University

School of Education

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A Dissertation

Presented in Partial Fulfillment

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LIST OF ABBREVIATIONS

AB	Attitude toward behavior
ACEN	Accreditation Commission for Education in Nursing
ANA	American Nurses Association
BSN	Bachelor of Science in Nursing
CCNE	Commission on Collegiate Nursing Education
EBCT	Evidence-based critical thinking (teaching strategies)
EBP	Evidence-based practice
IOM	Institute of Medicine
NLN-CNEA	NLN Commission for Nursing Education Accreditation
NLN	National League of Nursing
PBC	Perceived behavioral control
SN	Subjective norm
TPB	Theory of Planned Behavior

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CHAPTER I

INTRODUCTION

General Introduction and Background

An important area of concentration in nursing education has been the issue of fostering critical thinking in nursing students (Allen, 2013; Atay & Karahacak, 2012; Mann, 2012; Oja, 2011; Steiner, Hewett, Floyd, Lewis & Walker, 2010; Wane & Lotz, 2013). The ability to think critically is a primary competency needed by nurses to ensure safe and effective delivery of patient care. Yet research over the past several years indicates that graduates are not ready to perform critical thinking skills in practice (Chang, Chang, Kuo, Yang & Chou, 2011; Fero, Witsberger, Wesmiller, Zullo & Hoffman, 2008; Ryan & Tatum, 2012; Saintsing, Gibson & Pennington, 2011). The importance of infusing the nursing curriculum with critical thinking (CT) strategies that are evidence-based cannot be overemphasized. Continued use of traditional teaching methods has plagued the field of nursing education calling for a paradigm shift to new innovative methods of active learning (Glasgow, Dunphy, & Mainous, 2010; Kaddoura, 2011; Winters & Echeverri, 2012).

The current health care trends have influenced the delivery of education in nursing programs and at the center are the nurse educators who play a pivotal role in preparing students to function effectively in the health care field. Most studies seem to

agree that the changes in health care that include technological advances, increased challenges and complexities of patient care demand that nurses are prepared to efficiently use essential critical thinking skills in a multidimensional health care system (Chang et al., 2011; Finn, 2011; Mann, 2012; Robert & Petersen, 2013; Yildirim & Ozkahraman, 2011).

Much research has been dedicated to the importance of critical thinking in nursing, yet less attention has been devoted to examining nurse educators' intention to use critical thinking teaching methods in nursing student instruction. Nurse educators need to understand the importance of including proven teaching strategies to foster critical thinking skills in nursing students (Davis, 2013; Oja, 2011; Wane & Lotz, 2013). According to Wiggins and McTighe (2007), the mission and goals, curriculum, and strategic learning principles lay the foundation for the teacher's role, behavior, and instructional strategies. Although emphasis is placed on developing students' critical thinking skills in the nursing curriculum, there is no guarantee that instructors will integrate teaching strategies to foster these skills. Some writers have concluded that critical thinking skills are rarely taught in the classroom despite the overall emphasis on the value of problem solving in nursing practice (Kowalczyk et al., 2012; Patterson & Klein, 2012).

An educator's attitude in the learning environment has an impact on the instructional behaviors he or she is likely to display. In addition, a teacher's values and beliefs may influence what he or she does to help students achieve learning outcomes. Research indicates that teachers make a significant difference in how students reach their academic goals (Corso, Bundick, Quagua & Haywood, 2013; Firmender, Gavin, &

McCoach, 2014; Nathan, 2015). Traditional rote learning instruction methods such as lecturing have been associated with the marked critical thinking deficits noted in clinical practice (Kalmakis, Cunningham, Lamoureux & Ahmed, 2010; Wangenstein, Johansson, Bjorkstrom, & Nordstrom, 2010). Therefore, there is an urgent need to redesign nursing education in an era of increasing demand on nurses' duty and expectations in the workplace (Benner, Sutphen, Leonard, & Day, 2010; Benner, 2015; Glasgow et al., 2010).

Although some nurse educators have begun to embrace and use evidence-based teaching strategies in the classroom, the changing landscape of health care delivery requires a more determined focus on instructors' intention to use innovative strategies for critical thinking in nursing students. According to Spector & Odom (2012), "the high-level care needed for acutely ill patients with complicated illnesses require educators to be forward thinking with their nursing curriculum" (p. 40). Spector & Odom agrees that nursing education must change to meet these needs, otherwise nurses will not be prepared for efficient practice. Therefore, the relationship between a teacher's intention to use evidence-based teaching strategies based on attitude, influence of significant others, and perceived ability to perform and have control over using specific methods, is a topic that warrants further research especially in specific disciplines such as nursing education.

As such, this study will contribute to the field of nursing education by expanding knowledge regarding the factors that influence nurse educators' intention to use evidence-based critical thinking teaching strategies based on educator characteristics and the determinants of intention. In addition, gaining knowledge about the actual use of these teaching strategies will provide information about pedagogical practices in nursing

education. Also, it is expected that this study will add valuable knowledge to the area of learning and practice in nursing with implications for professional development and curriculum changes in nursing education programs.

Statement of the Problem

New nursing graduates are not prepared to meet entry requirements for clinical judgment and critical thinking (Ryan & Tatum, 2012). The lack of critical thinking skills in new graduates and practicing nurses has been associated with the use of traditional rote learning instructional methods evoking intense scrutiny into teaching techniques employed in nursing programs (Kalmakis et al., 2010; Wangenstein, et al., 2010). Other educator characteristics such as ethnicity, years of teaching, educational level, and training in teaching critical thinking may contribute to the kinds of instructional methods teachers employ. However, not enough research has been conducted to determine the factors that may influence educator intention to use critical thinking teaching strategies for nursing student instruction.

With the wide emphasis on critical thinking as an essential competency in nursing, a better understanding of factors that influence nurse educators' intention to use critical thinking teaching strategies that are evidence-based and the actual use thereof is needed. Therefore, the problem that was addressed by this study is the examination of the direct effect of attitude, subjective norm, and perceived behavioral control on intention to use instructional methods that promote critical thinking referred to as evidence-based critical thinking (EBCT) teaching strategies. Furthermore, this study's problem was routed through nursing educator characteristics that may provide a broader

perspective of influences relating to the scope of educator instructional behavior.

Without these data, stakeholders such as nursing educators and researchers may not have all the information needed to optimize utilization of critical thinking teaching strategies for the advancement of critical thinking instruction in the field of nursing education.

Theoretical Framework

A theory provides an explanation about how and why variables are related.

Therefore, confidence in understanding the relationship between variables is strengthened by a theoretical framework that provides a model for organizing the research questions or hypotheses and data collection (Creswell, 2012). In this study, the theoretical framework is centered around intention. This is based on Ajzen's 1991 Theory of Planned Behavior (TPB), an extension of the 1975 Theory of Reasoned Action (TRA). The TPB states intention is formed from a combination of attitude toward the behavior, subjective norm and perceived behavioral control. Before behaviors can be performed, an individual must have intention for those behaviors. In addition to these variables, other factors such as educator characteristics (ethnicity, years of teaching, educational attainment level, and training) influence intention. Studies about intention are applicable in this study for the following reasons: (a) they are built on a social psychology foundation; (b) they focus on perceptions and attitudes; (c) they deal with how attitude and perceptions affect behavioral outcomes. The best predictor of an individual's behavior is his or her intention to engage in that behavior (Cascio, Dal Cin, & Falk, 2013; Glasman & Albarracin, 2006). As applied to this study, intention, which is formed from attitude, subjective norm, and perceived behavioral control, refers to the amount of effort nurse

educators are willing to exert to use evidence-based critical thinking teaching strategies in baccalaureate nursing students. Therefore, it should follow that these determinants would positively or negatively impact nurse educators' intention.

One method of ascertaining the rigor and success of a theory is its history and longevity (Bagozzi, 1992). Spanning more than 50 years, the history of intention studies is further evidence of the extent of the focus on the intention-behavior relationship in the field of social psychology and indicates its validity and generalizability to analyze human behaviors. One example of a recent study using the field of social psychology to study intention and its formation was conducted by Smallman (2013). However, the use of intention as a field of study was first brought to prominence with Anscombe's (1957) account on intention. Other works on intention include Davidson (1963, 1980), Fishbein and Ajzen (1975), Ajzen (1975), Landis, Triandis, and Adamopoulos (1978), Thalberg (1984), Bratman (1987), Feldman and Lynch (1988), and Randall and Wolff (1994). Later, Bock, Zmud, Kim, and Lee (2005) and Smallman (2013) examined intention formation. Extensive research on intention has been conducted using the TPB in various domains. Some of the more recent research topics include teacher intention (Ajjan & Hartshorne, 2009; Kriek & Stols, 2010; Lee, Cerreto & Lee, 2010; Teo & Lee, 2010; Teo, 2011; Valtonen et al., 2015) and physical activity, nutrition, and lifestyle factors (McEachan, Conner, Taylor, & Lawton, 2011; Nelson, Cook, & Ingram, 2013; Vallance, Murray, Johnson, & Elavsky, 2011).

That nursing faculty are concerned about their students' learning is a given. As critical thinking teaching strategies have been shown to be an effective instructional approach noted by Kong, Qin, Zhou, Mou and Goa (2014), a seemingly prudent nurse

educator should be open then to use these teaching methods to foster critical thinking in nursing students. Atay et al., (2012) in their support of faculty using different learning strategies stated, “As nursing professionals of the future, nurses’ training includes learning and understanding the concepts needed for critical thinking and problems solving, autonomy and professionalism” (p. 234). Since intention is a direct consequence of one’s attitude, as well as the influence of subjective norm and perceived behavioral control, analysis of intention generated by individual and organizational factors that influence nurse educators’ use of critical thinking teaching strategies is important. Therefore, because critical thinking is so important, this study conceptualizes intention as follows: if nurse educators’ perceptions are positively affected by the independent variables (attitude, subjective norm, perceived behavioral control, and educator characteristics), then nurse educators’ intention (dependent variable) should be positive. A positive intention will then have a direct positive relationship with actual performance of critical thinking teaching methods that are evidence-based (dependent variable). However, if the independent variables affect intention negatively, then there is a possible likelihood that use of critical thinking teaching strategies will be lessened.

Numerous studies have indicated that critical thinking strategies used in teaching improve student learning and performance (Atay et al., 2012; Josephsen, 2013; Kowalczyk, 2011; Mann, 2012; Patterson & Klein, 2012; Wane & Lotz, 2013). Since critical thinking teaching strategies allow students to have “more flexibility in their thinking,” (Mann, 2012, p. 29) and has been shown to be effective for cognitive and clinical judgment skills development, one can agree that intention to use instructional methods that increase critical thinking ability in students should be priority for every

nurse educator. “Preparing skilled, safe, and competent nurse graduates is an essential focus of nursing education” (Phillips & Vinten, 2010). Nurse educators who are sensitive to the changes in health care and are aware of the competencies required by nurses will use learning activities to develop the skills necessary for nursing practice (Benner et al. 2010; Maneval et al., 2011; Tanner 2010; Waltz, Jenkins & Han, 2014). Given that this is true, in the context of intention, we would expect that if nurse educators’ intention is to help students achieve learning outcomes needed for professional practice, then they will be more likely have a relatively high intention to use and integrate critical thinking strategies that are evidence-based into their teaching repertoire. Furthermore, assuming nurse educators value the use of teaching strategies for critical thinking, as well as others’ approval and a normative degree of social pressure to use them, and strong perceived control and ability to use, it logically follows that the independent variables (attitude, subjective norm, perceived behavioral control, and educator characteristics) contribute to the outcome of the dependent variable, intention to use. In addition, it follows that intention to use will impact actual use. (See Theoretical Model, Figure 1, for the hypothesized relationships between the variables.)

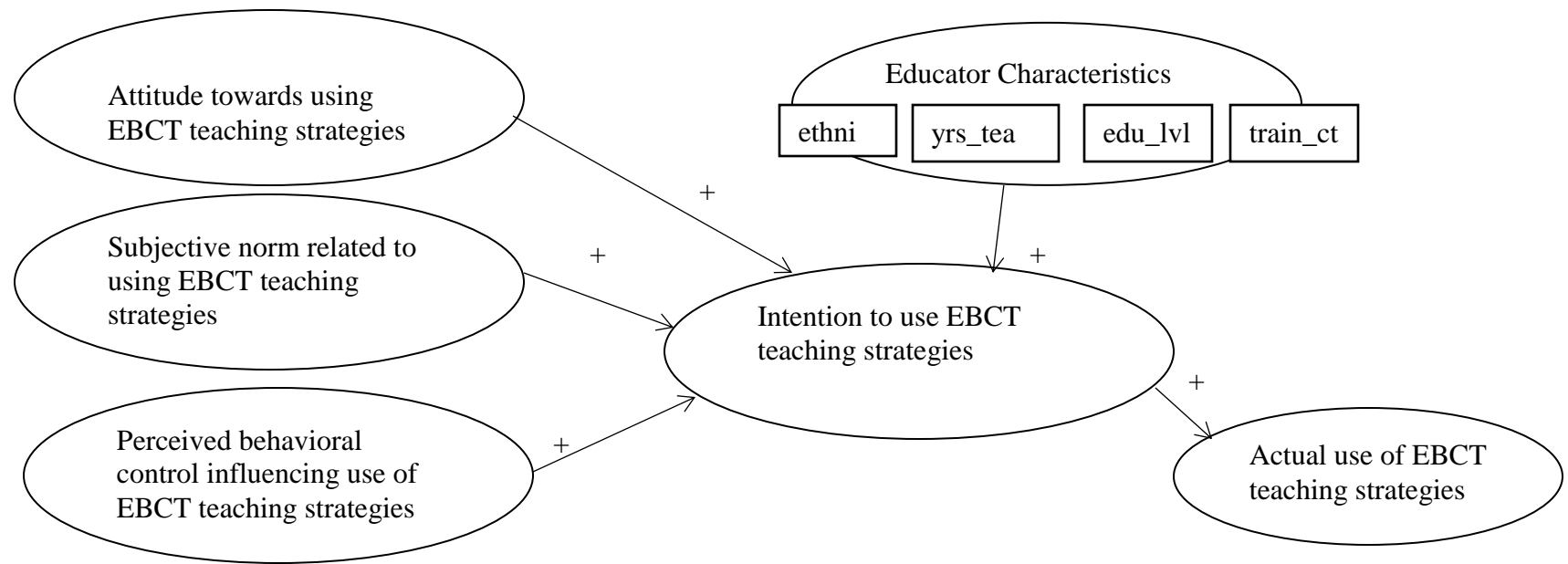


Figure 1. Hypothesized Theoretical Model. This figure illustrates (a) the direction of the relationships of attitude, subjective norm, and perceived behavioral control and educator characteristics on intention; and (b) intention on actual use. Ethni = ethnicity, yrs_tea = years of teaching nursing, edu_lvl = educational attainment level, train_ct = training in teaching critical thinking.

The Purpose of the Study

The purpose of this study was to seek an understanding of the relationships depicted in a theory-based hypothesized model and to test the model through “good fit” measures for model fit with the observed data. This study grounded in the theoretical framework of the Theory of Planned Behavior examined the relationship between (a) educator characteristics (ethnicity, years of teaching, educational level, training in critical thinking), and psycho-social behavioral attributes (attitude, subjective norm, and perceived behavioral control) on nurse educators’ intention to use EBCT teaching strategies and (b) intention to use critical thinking teaching strategies and actual use for instructing baccalaureate degree nursing students. This study focused on nurse educators who taught in baccalaureate degree nursing programs in the Southeast region of the United States.

Significance of the Study

As critical thinking is extremely essential to successful nursing practice, this study will contribute additional knowledge to the field of nursing education as a valuable research for identifying the relationship among factors that may impact nurse educators’ intention to use critical thinking strategies for critical thinking in nursing students. Although research has been done on teacher intention, little if any research has examined the relationship between (a) attitude, subjective norm, and perceived behavioral control and nurse educators’ intention to use critical thinking teaching strategies for critical thinking development in nursing students, and (b) intention to use critical thinking teaching strategies and actual use. Not only may this study add to the knowledge base of

educational trends in nursing education, but in the process of transforming nursing education in the 21st century, this study may also increase understanding and contribute to the efficacy of the intention-behavior model regarding the use of critical thinking teaching strategies that are evidence-based across the nursing curriculum. One expectation is that knowledge will be gained about factors that may impact instructional delivery to bridge the gap between theory in the classroom and nursing practice, and propel the inclusion of critical thinking instruction courses in nurse educator preparation programs.

The Research Questions

The overarching research question for this study is this: ‘Is the hypothesized model in Figure 1 showing direct effect between (a) nurse educators’ characteristics (ethnicity, teaching experience, education level, and level of training in teaching critical thinking), attitude toward using EBCT teaching strategies, subjective norm related to using EBCT teaching strategies, perceived behavioral control influencing use of EBCT teaching strategies on intention to use EBCT teaching strategies for critical thinking (dependent variable), and (b) intention to use EBCT teaching strategies and actual use supported by the data?

The following specific sub-questions will be addressed.

Question 1: Is there a significant direct effect of educator characteristics (ethnicity, years of teaching nursing, educational attainment level, and training in teaching critical thinking) on intention to use EBCT teaching strategies?

Question 2: Is there a significant direct effect of attitude towards using EBCT teaching strategies for critical thinking development on intention to use EBCT teaching strategies?

Question 3: Is there a significant direct effect of subjective norm related to using EBCT teaching strategies for critical thinking development on intention to use EBCT teaching strategies?

Question 4: Is there a significant direct effect of perceived behavioral control influencing use of EBCT teaching strategies for critical thinking development on intention to use EBCT teaching strategies?

Question 5: Is there a significant direct effect of intention to use EBCT teaching strategies for critical thinking development on actual use of EBCT teaching strategies?

Definition of Terms

The independent variables in this study that addressed the demographic educator characteristics were: ethnicity (ethni), number of years teaching nursing (yrs_tea), education level (edu_lvl), and training in critical thinking (train_ct). The theoretical definitions of these variables are as follows:

Ethnicity is defined as “the heritage, nationality group, lineage, or country of birth of the person or person’s parents or ancestors before their arrival in the United States” (U.S. Census Bureau, 2000).

Years of teaching nursing (yrs_tea) is defined as the number of years a nurse educator has been actively involved in teaching at the baccalaureate level.

Educational attainment level is defined as “the highest level of education that an individual has completed” (U.S. Census Bureau, 2000).

Training in Teaching Critical Thinking (train_ct) is defined as any formal or informal activity where information is shared about how to teach students to think critically.

The theoretical definitions for the other independent variables (attitude, subjective norm, and perceived behavioral control) are as follows:

Attitude is defined as the degree to which a person perceives the behavior based on favorable or unfavorable assessment of the behavior (Ajzen, 1991; Ajzen et al., 2004). The behavior addressed in this study is use of critical thinking teaching strategies that are evidence-based; therefore, the researcher chose ‘attitude toward using EBCT teaching strategies’ to name the variable.

Subjective norm is defined as any social influence that may determine if the individual performs or does not perform the behavior (Ajzen, 1991; Ajzen, Brown, & Carvajal, 2004).

Perceived behavioral control is defined as the level of confidence an individual has about their ability to perform the behavior based on how easy or difficult they perceive its performance as it relates to hindrances or facilitators (Ajzen, 1991; Ajzen, Brown & Carvajal, 2004).

The theoretical definitions for the dependent variables (intention to use and actual use) are as follows:

Intention to use, the dependent variable, is defined as “indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior” (Ajzen, 1991, p. 181).

Actual Use of EBCT teaching strategies, the other dependent variable, is defined as the justification, promotion, creation, and application of *teaching* methods that promote the preparation of nurses who are equipped to function in a constantly changing global health care environment (Emerson & Records, 2008).

The following general terms will be defined as follows in this study.

EBCT teaching strategies is an acronym created by the researcher to identify an evidence-based instructional method that promotes critical thinking, and is defined as a “strategy that is derived from or informed by objective evidence” (Glossary of Education Reform, 2013, p. 1). The evidence-based teaching strategies used in the current study include concept mapping, reflection, simulation, coaching, case studies, role modeling, and journaling.

Nurse educator is a registered nurse with a master’s or doctoral degree in nursing whose professional practice is the education of students at the university level.

Critical thinking in nursing practice is a focused type of reflective thinking that guides a nurse to create, implement, and evaluate methods for handling client care and professional responsibilities.

Baccalaureate nursing student is an individual who pursues a 4-year undergraduate nursing degree program at a college or university with no prior nursing experience or has an associate’s degree with some years in nursing practice.

Traditional teaching methods refer to any strategy that is more teacher-centered than learner-centered and allows the teacher to have more input and control over the learning relationship. Such methods include lecture, group discussion, demonstration, and return demonstration, and one-to-one instruction (Bastable, 2013).

Psycho-social behavioral attributes refers to the constructs in the TPB model indicating a combination of psychological and social characteristics that include attitudes (psychological), subjective norm (social) and perceived behavioral control (psychological).

Instructional behavior is teaching behavior related to techniques and methods used for learning in the educational environment including classroom and clinical settings.

Clinical reasoning is defined as “learning how to reason across time through changes in patient and/or changes in the clinician’s understanding of the patient’s condition and concerns” (Benner, 2015).

Clinical judgment is a process that requires the nurse to use knowledge and experience to act on relevant client data, interpret the data, and choose appropriate actions based on nursing diagnoses to address the client’s condition.

Clinical rotation is the portion of a nursing program where students render patient care in actual clinical situations under the supervision of an instructor in a variety of settings, for example, hospitals, clinics, physician’s offices.

Nursing education programs are the educational paths to become a professional nurse that includes baccalaureate nursing programs.

Nursing practice is the act of nursing that “requires specialized knowledge, skill, and independent decision making” in providing care in various settings. (National Council of State Boards of Nursing, 2015).

Southeast region of the United States includes the states of Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and West Virginia.

Limitations

The method of data collection using online surveys may limit the study through lack of participant response and unavailability of internet capacity. Other key limitations of the study may be the restricted sample of educators obtained from generic baccalaureate nursing programs only, the time given to complete the surveys, and the online objective format of the survey that will not accommodate collecting a range of responses. The study was limited to responses about attitude, subjective norm, perceived behavioral control based on a specific measurement scale. A potential threat to the external validity of this study was the fact that all of the nurse educators who participated taught in one particular geographical region that may affect the generalizability of the results.

Although specific information regarding the construction of a questionnaire for TPB was adhered to, internal validity could be threatened by substituting specific language to match the behavior suitable for the context of this study.

Delimitations

This study was narrowed to include only nurse educators working in 4-year baccalaureate degree nursing programs in both didactic and clinical instruction settings. Nursing faculty from other nursing program options or degree programs were excluded. The area of focus was specific to the Southeast region of the United States that includes ten states with approximately one hundred and fifty 4-year baccalaureate nursing programs. The variables in this study were measured by one instrument, the Intention to Use Questionnaire. This study concentrated on the direct measures in the TPB theoretical framework that provided the foundation for examining the relationship between the independent and dependent variables and testing the model fit of the observed data.

Organization of the Study

Chapter 1 provides an introduction into the background of the problem and an overview of the focus of this research study and includes the statement of the problem, purpose of the study, significance of the study, theoretical framework, and research questions. Chapter 2 focuses on the review of the literature as relating to the body of knowledge on teacher intention and the use of the TPB model, the role of attitude, subjective norm, and perceived behavioral control as determinants of intention in various contexts including education, critical thinking in nursing education and nursing practice, use of teaching strategies for the development of critical thinking skills, and the relationship between critical thinking and evidence-based practice. Chapter 3 discusses the components of the methodological design that guided the data collection process and analysis of the study. A description of the population and sample, hypotheses, definition

of variables, and instrumentation is presented. Chapter 4 details the analysis of data and results providing descriptive statistics, model representation, and results. Chapter 5 presents a summary of the study; discussion; interpretation and evaluation of the findings; conclusions; recommendations for practitioners, administrators, curriculum designers, program evaluators, policy makers, and accreditation bodies; recommendations for further research; and implications for nursing education.

Summary

The study sought to identify the influence of factors through a hypothesized model that may contribute to intention to use teaching strategies to foster the essential competency of critical thinking in nursing. Specifically, this study addressed the problem of deficient critical thinking skills in new nursing graduates from the standpoint of investigating the relationship between factors such as attitude, subjective norm, perceived behavioral control and educator characteristics that may influence nurse educators' intention to use critical thinking teaching strategies that are evidence-based for critical thinking development.

The TPB model developed by Ajzen (1991) provided the theoretical framework for understanding the relationship between the independent variables (attitude, subjective norm, perceived behavioral control, and educator characteristics) and the dependent variable intention to use. The TPB model also depicted the relationship between intention to use and actual use. The results from this study may be useful in effecting change in nursing education in the 21st Century by identifying the relationship between psycho-social behavioral factors and educator intention and behavior.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

In order to obtain published research articles for the present study, the researcher conducted searches of the EBSCO, Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medline, PsycINFO, ERIC, and PubMed data bases. Google scholar was also utilized as an alternate guide for research. In addition, I reviewed reference lists of the articles for other possible sources of information. Primary search terms such as “intention,” “theory of planned behavior and intention”, “teacher intention to use teaching strategies,” “teacher intention,” “teaching strategies for critical thinking,” “critical thinking skills in nursing education,” “critical thinking skills in nursing students,” “nursing faculty teaching strategies,” evidence-based nursing education,” and “critical thinking ability of new RN graduates” were entered into the databases.

The literature review begins the discussion with an overview of the Theory of Planned Behavior and its application in intention studies. This is followed by a presentation of the research on the variables in the study to include (a) teacher intention relating to implementation of teaching strategies based on TPB (attitude, subjective norm, perceived behavioral control, actual use, and educator characteristics). Specific emphasis on critical thinking as reported in the literature is presented to include (a) definitions of

critical thinking and application of critical thinking in nursing education and practice; (b) evidence-based teaching strategies; and (c) issues related to fostering critical thinking.

The Theory of Planned Behavior

Overview

This study was conducted to seek an understanding of the relationship between nurse educators' intention to use critical thinking teaching strategies that have been shown in the literature to improve critical thinking (evidence-based), and actual use of these techniques, through the framework of demographic and psycho-social behavioral characteristics. Therefore, an exploration of a theory fitting these variables is imperative. Such is the Theory of Planned Behavior developed by Ajzen (1991). This theory has been widely investigated and has survived the rigor of establishing the delicate relationship between behavioral intention and its determinants, namely attitude, subjective norm, and perceived behavioral control in a number of contexts including health care and education (McEachan et al., 2011; Lee et al., 2010). Although widely used in a variety of settings, few studies were found in the literature that focused on teacher intention and use of instructional techniques.

The Theory of Planned Behavior (TPB) according to Ajzen (1991) is a theory that was created to explain a variety of human behaviors in different contexts or environments. The underlying premise of the TPB is that behavior is planned and purposeful (Ajzen, 1991). This theory's model is built against a background of research specifically in the area of intention-behavior relationship and was developed as an extension of the Theory of Reasoned Action (TRA) created in 1975 with revisions in

1980. The TRA is related to voluntary behavior and posits that an individual's behavior is determined by behavioral intentions that are driven by an individual's attitude toward the behavior and subjective norm influencing the performance of the behavior. (Ajzen & Fishbein, 2004). According to Ajzen (2002) the TRA addressed examination of human behavior that was under volitional control and could be predicted mainly from intention. The TPB added the construct of perceived behavioral control as a determinant of intention for situations that were out of volitional control (Ajzen, 1991).

Historically, psychologists have been interested in intention and its effect on behavior in many different cultures and occupations. The Theory of Planned Behavior focuses on intention by separating the three determinants of intention, namely attitude toward the behavior, subjective norm, and perceived behavioral control. These determinants according to Ajzen (1991) provide a comprehensive method of predicting intention. Ajzen (1991) defines intention as an indication of the degree of effort and hard work individuals are willing to engage in to perform the behavior. The researcher adapted the variable behavioral intention based on Ajzen's definition and renamed 'intention to use.'

Much of the research done with intention as reported in meta-analyses have concluded that prediction of intention can be achieved through the three determinants – attitudes toward the behavior, subjective norm, and perceived behavioral control (McEachan et al., 2011). Behavioral intention has been identified in the theory as the most significant predictor of behavior (Ajzen, 1991; Ajzen & Madden, 1986). Ajzen and Fishbein (2005) contend that intention to perform a behavior is the main precursor of actually performing the behavior. In other words, one must engage in some thought

processes that may be influenced by various factors leading to the formation of intention. While intention does not necessarily guarantee performance of a behavior, research has established this construct as a reliable predictor as reported in meta-analyses (McEachan et al., 2011).

In identifying the main element for understanding human behavior as it relates to intention, attitude remains the dominant feature (Ajzen & Fishbein, 2005; Capo & Orellana, 2011; Freberg, 2013; Lee et al., 2010; Pierce & Ball, 2009; Teo & Lee, 2010; Teo, 2011). According to Ajzen (1991), attitude toward behavior considers both the favorable and unfavorable aspects of the targeted behavior. In research that has been conducted in teacher intention to use instructional techniques for integrating technology in the classroom that is discussed in a later section of the study, attitude was found to be a significant predictor of intention to use technology (Capo & Orellana, 2011; Lee et al., 2010; Teo & Lee, 2010; Teo, 2011). The second determinant is characterized by Ajzen (1991) as the degree of perception that a person holds about the level of social force to perform or not perform a behavior. This social pressure can come from significant others, colleagues, organizations, and society at large. Some of the individuals and/or organizations that may be influential in the current study would be nursing faculty, the nursing program chair/dean/director, the governing organization, the board of nursing, and the accreditation agency.

The third determinant, perceived behavioral control as described by Ajzen (1991), can be equated with the premise held by Bandura's concept of self-efficacy. One's belief in his or her ability to successfully engage in the behavior is the essential component drawn from Bandura's self-efficacy model. The PBC determinant considers two main

areas, namely perceptions of having adequate control and management of resources that facilitate successful performance of the behavior, as well as the perceived level of ease or difficulty associated with doing the behavior. In the intention-behavior relationship in the theory, perceived behavioral control takes into consideration those internal and external features that may impact the behavior (Ajzen, 1991). Relating to the internal factors of perceived behavioral control and behavior, Ajzen (1991) notes that if an individual perceives that a behavior poses too much difficulty to perform, there is an increased likelihood that his or her perceived behavioral control will be poor.

The examination of intention as it relates to behavior is important because according to Ajzen and Fishbein (2005) some individuals do not act or perform their stated intentions. In other words, an individual may state an intention to do something, but perform a totally different task or not perform the behavior at all. This has been illustrated in past health-related research in areas of physical activity, dietary behaviors, and risk behaviors (McEachan et al., 2011).

Specific to this study, three assumptions of the TPB will be considered. These assumptions are as follows:

1. Intention is the immediate antecedent of actual behavior.
2. Intention, in turn, is determined by attitude toward the behavior, subjective norm, and perceived behavior control.
3. The relative degree of influence that attitude, subjective norm, and perceived behavioral control has on intention may vary in significance by population and behavior studied (Ajzen & Fishbein, 2005).

Applications

Specifically relating to this study, research utilizing the TPB model in examining teacher intention for using instructional methods to date is relatively limited. An exhaustive search of the literature yielded less than ten studies within the last fourteen years, with only about five in the past five years. One recent study by Valtonen et al. (2015) that investigated pre-service teachers' intention to use ICT for teaching and learning, based on learning experiences, that used structural equation modeling (SEM) analysis revealed that in both administrations of pre- and post-tests using different ICT applications, subjective norm had a significant impact on attitudes ($\beta = 0.68, p < .00$) and ($\beta = 0.65, p < .00$); and behavioral intention ($\beta = 0.25, p < .00$ and ($\beta = 0.17, p < .05$). The models showed that attitude was strongly related to behavioral intention in the pre-test ($\beta = 0.62, p < .00$) and the post-test ($\beta = 0.56, p < .00$). Attitude also had a statistically significant effect on self-efficacy in both models ($\beta = 0.44, p < .00$) and ($\beta = 0.45, p < .00$). Two relationships that were not statistically significant were the relation between self-efficacy and behavioral intentions in the pre-, and between subjective norm and self-efficacy in the post-test model.

Lee et al., (2010) conducted another study that demonstrated use of the theory appropriate for the current study. This research focused on investigating teachers' intention on the use of educational technology using the three direct determinants of behavioral intention – attitude toward the behavior, subjective norm, and perceived behavioral control. Multiple regression conducted generated a positively strong statistical significance for attitude toward the behavior ($t [133] = 8.481, p = 0.001$),

subjective norm ($t [133] = 3.446, p = 0.001$), and perceived behavioral control ($t [133] = 2.386, p < 0.05$) and teachers' intentions to use computers in education. Seventy percent of the variance in teachers' intentions was explained by the three determinants – attitude, subjective norm, and perceived behavioral control. Attitude toward behavior was the most powerful influence on teachers' intentions to use computers for instructional purposes ($\beta = 0.569$).

That teachers' intention influences actual use of instructional strategies was further noted by Kriek and Stols (2010) who were able to predict teacher behavior intention on the actual use of interactive simulations with 70.83% accuracy. Another study where the TPB was shown to be beneficial in understanding phenomena is in faculty decisions to adopt Web 2.0 technologies (Capo & Orellana, 2011). Although the TPB has been used in education relating to teachers' intention, this theory has not been used to examine the relationship with nurse educators' intention to use critical thinking teaching strategies.

The general conclusion of the theory is that the more favorable an individual's attitude and subjective norm related to the behavior, and the more prominent the perceived behavior control of one's actions, the more potent will be the intention to perform the behavior under study. Further applying to the current study, it is logical that if an educator values or does not value the use of a particular instructional method, then he or she may tend to use it more often or less often in teaching. Also if a nurse educator views the approval of other influential individuals regarding the use of CT strategies and has confidence in using the strategy, then he or she may be encouraged to use the strategy more often.

Studying the relationship between intention and behavior is essential based on the theoretical premise that intention may not necessarily result in action as shown in previous studies (McEachan et al., 2011). Therefore, this study is geared towards examining the relationship between intention to use EBCT teaching strategies and actual use to find out if a relationship exists between nurse educators' intention to use EBCT teaching strategies and actual use.

Examples of studies conducted over the past several years using the TPB to understand the relationship between intention and behavior in other contexts and with different behaviors include clinical decision to integrate evidence in nursing practice (Cote, Gagnon, Houme, Abdeljelil, & Gagnon, 2012), health-related topics such as eating disorders and body satisfaction (Pickett et al., 2012), health behavior type (physical activity, dietary habits), risk behaviors (abstinence - safe sex) (McEachan et al., 2011), lifestyle factors (Moshki & Torabi, 2014), intention to continue treatment after drug and alcohol detoxification (Kelly, McCarthy & Crowe, 2011), continued education for mental health professionals (Casper, 2007), and physical activity in postmenopausal women (Vallance et al., 2011). The following section will highlight a few of these studies.

McEachan et al., (2011) reviewed 206 articles in a meta-analytic process to examine the application and efficiency of the theory of planned behavior to predict behavior and explain the relationship between attitude, subjective norm, and perceived behavioral control, and intention in health-related behaviors. In general, attitude toward the behavior and perceived behavioral control significantly explained variation in intention. This meta-analysis showed that overall, intention was the strongest predictor of prospective behavior ($M = 0.43$, $SD = 0.19$). For direct measures, attitude was found

to have the strongest correlation in predicting intention ($M = 0.57$, $SD = .18$), with perceived behavioral control next ($M = .54$, $SD = 0.22$), and subjective norm ($M = 0.40$, $SD = 0.21$) the weakest. Results of the analysis based on specific behaviors showed that attitude emerged as "the strongest predictor of intentions for all behaviors except detection behaviors (where PBC is most important) and risk behaviors (where attitude and PBC make similar contributions)" (p. 112). With specific behaviors such as safe sex, McEachan et al. (2011) indicated that subjective norm was the greatest predictor of sexual behavior related to intention to safe sex practices ($\beta = 0.32$) more than perceived behavioral control ($\beta = 0.26$). Subjective norm was found to be a more important predictor for risk ($\beta = 0.23$) and dietary behavior habits ($\beta = 0.23$).

As a demonstration of the versatility of the TPB, one particular study by Freberg (2013) conducted with 24 participants supporting attitude as the best predictor of intention, found "that instrumental attitude (.76, $p < .001$)", and "experiential attitudes (.23, $p < .001$)" were statistically significant in predicting intention to comply with a food recall message. Subjective norm predicted intent at a lesser degree (.07, $p < .01$), while perceived behavioral control did not predict intention. Confirmatory factor analysis was used for model fitting, and after removing items with non-significant loadings, an acceptable model fit was obtained ($CMIN/DF = 3.5$, $GFI = .916$, $RMSEA = .079$).

Kelly et al. (2011) conducted a study to predict intention to continue treatment after residential drug and alcohol detoxification. Using logistic regression analysis, these researchers found that attitudes and perceived behavioral control significantly predicted intent. The model was an acceptable fit ($X^2 = 36.43$, $p = .00$) and accounted for 32% variance in intent. These researchers concluded that based on the results, the TPB model

is useful in identifying individuals who are likely to attend follow up detoxification programs and indicate where intensive interventions need to be applied for those less likely to attend follow-up programs.

In sync with the health-related theme of studies, Vallance et al. (2011) studied the intention and behavior of post-menopausal women to engage in physical activity based on public health guidelines. Using a cross-sectional survey design based on the TPB with 297 post-menopausal women, the results showed that 67% of the women intended to engage in physical activity using the guidelines. Multiple regression analysis indicated that the elements of TPB explained 44% of the variance in intention ($R^2 = 0.44$, $F = 37.6$, $df = 6, 284$); instrumental attitude ($\beta = 0.33$), affective attitude ($\beta = 0.29$), descriptive norm ($\beta = 0.19$), and self-efficacy ($\beta = 0.24$). Physical activity intention ($\beta = 0.30$) explained 23% of the variance in physical activity behavior ($R = 0.23$, $F = 86.68$, $df = 1$, 294). Perceived behavioral control did not add any significant contribution to the model and only added 3% to the variance in behavior.

Casper (2007) measured mental health professionals' intention, attitude, subjective norm, and perceived behavioral control regarding implementation of a new assessment tool for individuals with mental illness. Ninety-four participants took part in the study, 46 assigned to a TPB format and 48 to the standard format. Results showed that there was significant improvement in knowledge for both groups (paired $t = 43.30$, $df = 93$, $p < .001$). However, the mean post-class intention scores were greater for the TPB group ($M = 58.5$, $SD = 2.7$), compared to the standard format group ($M = 50.4$, $SD = 6.9$). The author concluded that using the TPB with its components of attitude, subjective

norm, and perceived behavioral control to assess the factors that influence intent is a viable method to use for continuing education.

Nelson et al.'s (2013) study on predicting nursing staff's (medical assistants and licensed practical nurses - LPNs) behavior relating to blood pressure monitoring revealed that perceived behavioral control and subjective norm predicted intention to measure blood pressure accurately. Intention was found to be the only significant predictor of the behavior of blood pressure monitoring, and attitude did not predict intention ($r = 0.28, p = 0.07$). Perceived behavioral control and subjective norm had a positive effect on intention ($r = 0.37, p = 0.01$); and ($r = 0.37, p = 0.006$). Knowledge, although not a predictor of intention, showed a negative relationship to intention ($r = -0.37, p = 0.01$).

Cafiero (2013) conducted a study to investigate nurse practitioners' intention to use health literacy strategies in clinical practice. Using the Health Literacy Strategies Behavioral Intention instrument to measure attitude, subjective norm, and perceived behavioral control on a Likert scale of 1 to 7, this study found an attitude subscale score of 6.27 indicating a positive attitude toward using the strategies; subjective norm of 4.62 indicating a lesser influence on using the strategies; perceived behavioral control 5.48 indicating that there was a high perception of control over using the strategies; and an intention mean score of 5.12 showing high intention of using health literacy strategies in nursing practice.

Ajzen and Fishbein (2005) agree that some background factors such as age, gender, ethnicity, education, and exposure to information may indirectly impact intention through the determinants of attitude, subjective norm, and perceived planned behavior. Although some research has shown a direct relationship between specific background

factors (Cafiero, 2013; Schnall & Bakken, 2011) and intention, Ajzen and Fishbein (2005) cautions that most effects on intention may be small. Variation in research results related to background factors have shown that in some studies factors such as age did not have a direct effect on intention (Cafiero, 2013), while another study showed that age had a negative effect on adolescent lifestyle factors and quality of life (Moshki & Torabi, 2014). In Cafiero's (2013) study on nurse practitioners' intention to use health literacy strategies based on the practitioners' knowledge and experience, there was a statistically significant relationship between post-masters certificate and doctoral educational preparation ($p=.039$). These results support the theoretical framework that differences may exist across behaviors as they relate to each determinant of intention (McEachan et al., 2011).

A more recent study conducted by Schnall & Bakken (2011) sought to explain the use of the Technology Acceptance Model (TAM) on behavioral intention through factors such as perceived ease of use, perceived usefulness, and perceived barriers to use. The results of this study with 94 HIV case managers has found ethnicity ($t = 2.25, p < 0.05$), and gender ($t = 2.37, p < 0.05$) to be significantly correlated with behavioral intention to use a continuity of care record with individuals living with HIV.

No recent study has been found in education for the intention-behavior relationship dealing with factors such as education level, years of teaching experience, and ethnicity. However, one study by Bagnardi (2006) may shed light about the impact of these factors on implementation of instructional strategies with the current study's population. In Bagnardi's study of nursing faculty's intention to use service learning, teaching experience, tenure status, and curriculum type were found to have a direct

impact on intention, with teaching experience being the most significant predictor of intention to use this strategy. Using this trend in the literature, there was value in exploring certain variables such as number of years teaching nursing, educational attainment level, informal and formal critical thinking training, and ethnicity that may impact nurse educators' intention to use evidence-based teaching strategies to foster critical thinking in nursing students. In light of the current study that seeks to understand the relationship among factors that influence nurse educators' intention to implement critical thinking teaching strategies, examination of this phenomenon is critical as there may be serious implications for the trends in nursing education and nursing practice.

Teacher Intention and Teaching Strategies

Many studies in various domains have been conducted using the framework of the TPB to understand the relationship between intention and behavior (Cafiero, 2013; Kelly et al., 2011; McEachan et al., 2011; Nelson et al., 2013; Pickett et al., 2012; Schnall & Bakken, 2011). The field of education is no exception in this regard, and research focusing on teacher intention and behavior, although sparse, has received some attention in the literature.

In reviewing the literature, only two studies emerged that addressed specific aspects of the current study, with a span of four years between (Bagnardi, 2006; Kriek & Stols, 2010). The first study, although dated, is included because this was the only study found that used the same population as the current study investigating nursing faculty's intention. Using a correlational, predictive research design, Bagnardi (2006) investigated factors that influence nursing faculty's intention to use service learning in the curriculum.

This study among 160 nursing faculty members used background factors such as years of teaching experience, tenure status, and curriculum type in addition to the beliefs that guide the determinants of intention to examine this relationship. A strong statistically significant relationship was found between behavioral beliefs and intention to use service learning ($r [160] = .521, p < .05$), normative beliefs (influence of peers) and intention ($r [160] = .719, p < .05$), and a weak correlation between control belief (confidence and resources) and intention to use service learning ($r [160] = .649, p < .05$). The TPB explained 79% of the variance found among the variables. A path analysis approach showed a significant direct relationship between normative beliefs (influence of peers – administrators, colleagues, and students) and intention of nursing faculty to use service learning ($\beta = .67$). Teaching experience had a direct influence on behavioral intention to use service learning ($\beta = .15$). Although not as strong a relationship was achieved by increased tenure status ($\beta = .07$) and community-based curriculum ($\beta = .08$), as teaching experience, these variables still yielded a positive relationship.

The other study by Kriek and Stols (2010) dealt specifically with implementing simulations for classroom teaching using an experimental design. Using a sample of physical science teachers from Grade 10 through to Grade 12, this study used two models, one of which is the TPB to examine teachers' intention to use and actual implementation of physics education technology (PhET) in the classroom. Attitudes, subjective norm, and perceived behavioral control were measured as predictors for intention to use simulations. The results showed that in the subjective norm area, expectations of colleagues were significant to influence actual use of using simulation. Fourteen teachers (58%) intended to use the technological strategy with simulation and

used it, three teachers (13%) had no intention to use and did not use technology in their classrooms, five teachers (21%) were going to use and did not use, and two teachers (8%) did not intend to use technology in teaching, but actually used the simulation method.

Simulation has been identified in the literature as one of the methods that fosters the development of critical thinking skills (Kriek & Stols, 2010; Park et al., 2013; Wane & Lotz, 2013). The findings from Kriek and Stols' (2010) study reiterate the need to further investigate the factors that impact how teacher intention affects the kind of teaching behaviors instructors display. For the current study, knowing that factors directly influence intention to use critical thinking teaching strategies, as well as the effect of intention to use on actual use, could provide valuable information for ensuring that critical thinking competencies are addressed in the learning environment.

The TPB has been used to predict instructors' intent to implement specific teaching behaviors (Marandu, Shine, & Joseph, 2011). Marandu et al. (2011) in their investigation of science teachers' intention to teach about HIV/AIDS found the TPB model to explain 26% of the variation in intention. Bivariate and multivariate analyses were conducted. The model showed a multiple R of 0.511, a R^2 of 0.261, and an adjusted R^2 of 0.246 was realized in the model. Unlike most studies using the TPB, this study found that perceived behavioral control was the only variable that contributed a statistically significant result ($\beta = 0.495$, $t = 6.220$, $p = 0.000$). The other two determinants attitude ($\beta = 0.018$, $t = 0.234$, $p = 0.815$) and subjective norm ($\beta = 0.032$, $t = 0.386$, $p = 0.700$) did not show significant differences related to intention. Although the majority of studies using the TPB model found attitudes to be the best predictor of intentions, Marunda et al.'s (2011) study with science teachers in Botswana found

subjective norm to be the better predictor of intention over attitude due to the sensitive nature of teaching HIV/AIDS.

A wide literature search on TPB yielded results with the vast majority of studies on teacher intention to implement technology into their instructional delivery (Pierce & Ball, 2009; Teo, 2011; Teo & Lee, 2010; Lee et al., 2010). All of these studies found attitude toward the behavior to be the best predictor of intention. In Pierce and Ball's (2009) study that sought to identify perceived barriers to using technology in teaching mathematics using a survey research design method, barriers to perceived behavioral control were identified as cost of equipment, time to cover course material, and training needs. The results indicated (a) 24% of teachers identified the lack of time as a barrier to using technology, (b) 15% indicated that learning about using technology is a barrier based on personal time, and (c) 21% reported difficulty if they had to experience problems using technology. The greatest influence whether or not technology was used in the classroom was colleagues' expectations (79%), and there were no feelings of pressure from parents to use technology. With the rapid growth in technological approaches to education, these researchers emphasize teachers must be open to the change needed to transition from traditional methods and to learn new ways of incorporating technology efficiently in the classroom. This recommendation holds true for teachers in every discipline and is applicable to the current study.

Teo and Lee (2010) studied pre-service teachers' intention to use technology using the TPB model. Using the structural equation model (SEM) framework, the findings revealed an acceptable fit of the measurement model ($\chi^2=65.147$, $p < .004$; $\chi^2/df = 1.714$; $TLI = .967$; $CFI = .977$; $RMSEA = .068$; $SRMR = .038$) and the structural model

showed that 39.2% of the variance in intention to use technology was explained by attitude, subjective norm, and perceived behavioral control.

In researching the factors influencing teachers' intention to use technology and create an associated test model, Teo (2011) distributed a survey to 592 school teachers. The results using SEM analysis showed that behavioral intention to use technology ($R^2 = 0.613$) yielded a large percentage variance. Behavioral intention was measured through perceived usefulness, attitude towards use, subjective norm, and facilitating conditions that accounted for 61.3% of the variance. In other words, these four variables had a significant impact on influencing behavioral intention to implement technology in teaching among the sample.

Despite the limited empirical support on teacher intention and behavior, compared to other domains where the TPB has been used, the researcher expects that the current study will enlighten the field of nursing education about the factors that may influence faculty productivity in the area of critical thinking instruction and development. To date, little if any research has addressed this important area in nursing education from a psycho-social behavioral perspective. Intention to use critical thinking teaching strategies that are evidence-based from the standpoint of demographic/educator characteristics, attitudes toward the use of EBCT teaching strategies, subjective norm influencing use of EBCT teaching strategies, and perceived behavioral control regarding intention to use EBCT teaching strategies and the actual use of EBCT teaching strategies is an essential area worth investigating. The researcher hopes that more empirical evidence in the area of teacher intention in various disciplines will be added to the body of literature using the TPB framework.

An example of a research study that coincides with the topic of the present study is Patterson and Klein's (2012) study to identify the evidence or best practices nurse educators are implementing in teaching. This study among 295 nurse educators sought to identify current teaching strategies, enhancers and barriers to implementing evidence-based teaching practice, and sources of evidence used to guide teaching. The results indicated that 48% of the nurse educators acknowledged their ability to use evidence in teaching based on their educational backgrounds. The most frequent element that influenced implementation of best practices was the nurse educators' personal beliefs (77.3%). Barriers to evidence-based teaching practice included institutional (25%), departmental (18.3%), colleagues (16.9%), administration (21.7%), and time (13.9%). Patterson and Klein (2012) stressed that in order to implement best practices in nursing education, all nurse educators must be responsible for using a systematic method of identifying the evidence that supports the instructional methods they use. The TPB informs that intentions are influenced by beliefs and play a significant role in influencing behavior as well as other factors that may facilitate or impede performance of the behavior. Given the urge to produce nurses who will be prepared to function in a complex health care system, the factors that impact how nursing students are taught must be examined.

Critical Thinking in Nursing Education and Practice

Overview

The concept of critical thinking has many elements and definitions. As a result, teaching and assessing the essential thinking skills pose difficulties for educators.

Applicable to this study, the researcher chose to use the only definition of critical thinking that speaks specifically to nursing from the National League for Nursing (2001) that states, “Critical thinking in nursing practice is a discipline specific, reflective reasoning process that guides a nurse in generating, implementing, and evaluating approaches for dealing with client care and professional concerns” (p. 3). Critical thinking in nursing education continues to receive focused attention in the nursing literature (Balakas, Sparks, Stauer, & Bryant, 2013; Freed & McLaughlin, 2013; Newton & Moore, 2013; Yildirim & Ozsoy, 2011).

The Delphi Study was undertaken in 1988 with the meeting of a panel of forty six critical thinking experts who sought to define critical thinking and identify cognitive skills and affective dispositions that is characteristic of the ideal critical thinker (Facione, 1990). Fifteen recommendations for integrating critical thinking in the education system and life in general were formulated from this ten-year study. Facione (2013), based on the Delphi study defined critical thinking as purposeful, and highlighted core cognitive skills to include the ability to interpret, make inferences, evaluate, explain, analyze, and self-regulate. These core cognitive thinking skills can be further explained as follows:

1. *Interpretation*: accurately comprehend the significance of various types of information and experiences.
2. *Inference*: draw conclusions and consider relevant information from various forms and sources of data.
3. *Evaluation*: examine information for credibility and relevance.
4. *Explanation*: reason and present material in a comprehensive format with contextual appropriateness.

5. *Analysis*: scrutinize the relationships among data, statements, problems and identify possible direction or solutions.

6. *Self-regulation*: to assess one's cognitive habits against standards through inquiry to ascertain if thinking is clear, accurate, precise, relevant, logical, fair, significant, and contains depth and breadth (Paul & Elder, 2009).

Other definitions include reflective reasoning, and a display of intellectual standards as constituting desirable traits of a critical thinker (Paul & Elder, 2009).

The use of critical thinking skills is necessary for both the clinical practice environment and as an element in nursing education curricula. Nursing programs are required by accrediting bodies such as the Commission on Collegiate Nursing Education (CCNE), the Accreditation Commission for Education in Nursing (ACEN), and the National League for Nursing Commission for Nursing Education Accreditation (NLN - CNEA) to provide learning opportunities that contribute to the development of essential critical thinking skills in students. These skills are priority competencies to ensure safe and efficient delivery of patient care resulting in favorable patient outcomes.

Researchers investigating the concept of evidence-based education have agreed that the practice of the discipline based on empirical research should also be reflected in the delivery of the education program (Benner et al., 2010; Glasgow et al., 2010).

Translated to the field of nursing education, the urgent charge for nurse educators is to change teaching techniques from merely covering massive amounts of content to incorporating evidence-based strategies of instruction to develop clinical reasoning skills (Balakas et al., 2013; Benner et al., 2010; Finotto, Carpanoni, Turrone, Camellini, & Mecugni, 2013; IOM, 2011; Tanner, 2010). This notion has been proliferating in the

nursing literature urging administrators and faculty to intentionally use innovative pedagogies, and evidence-based practice elements in the nursing curriculum to achieve student learning outcomes (Kantor, 2010; Glasgow et al., 2010).

Applications

As the health care system continues to change, nurses need to have the ability to interpret, analyze, evaluate, infer, and explain information as they interact with patients from various cultures across the lifespan. As a result, fostering critical thinking skills becomes an integral part of the nursing curriculum. Given the emphasis on the value of critical thinking in nursing education and practice, the researcher was surprised that there was a lack of literature on factors that influence the educator's role in teaching critical thinking. Most of the research studies found focused on the importance of critical thinking and the strategies that have been used, but none focused on specific educator factors that may impact educator intention and actual use of the strategies.

According to Mann (2012) with an increase in the complexity of patient health conditions, nursing programs are mandated to include instructional activities that foster the development of critical thinking and the ability to engage in appropriate clinical judgment. This author conducted an experimental, pre- and post-test mixed method research study that aimed to evaluate the effectiveness of using the grand rounds educational technique for critical thinking and clinical judgment development with baccalaureate nursing students. The Lasater's Clinical Judgment Rubric was utilized and t -tests and Spearman's rho were used to examine the relationship between clinical judgment and critical thinking. Although no significant difference in critical thinking

skills was found using a Critical Thinking Assessment (CTI) tool for the first or second administration ($t = 5.22, p = .607$; $t = 1.217, p = .238$) between the intervention and comparison groups, the results showed an increase in critical thinking scores for the intervention group ($M = 36.33, SD = 15.16$) compared to the comparison group ($M = 22, SD = 5.66$). This author recommended use of more cooperative learning strategies and promoted the grand rounds strategy as a teaching method for critical thinking development.

Newton and Moore (2013) urged educators to intentionally include instructional strategies that will evoke a sense of inquiry and stimulate critical thinking. In their exploratory descriptive study examining critical thinking skills of basic baccalaureate and accelerated 2nd degree nursing students, the accelerated students achieved higher scores on all six critical thinking competencies tested on the Critical Thinking Assessment: Entrance test compared to the basic BSN students. The inference competency had the lowest mean scores for both groups ($M = 50.57, SD = 17.53, p = 0.002$ for the ASD; and $M = 54.39, SD = 15.07$ for the BSN), while self-regulation had the highest ($M = 92.16, SD = 15.73, p = 0.005$ for the ASD; and $M = 86.05, SD = 18.31$ for the BSN). Newton & Moore admonished nurse educators to use new teaching strategies and adapt learning experiences in theory and clinical areas to meet students' critical thinking skills and abilities.

In order to ensure that students acquire the ability to think critically and apply relevant theoretical knowledge to clinical nursing practice, Davis (2013) argues that pedagogy should be informed by students' individual learning styles. Such an approach would incorporate learning experiences involving the various senses of sight, sound,

smell, and touch to enhance learning and application of knowledge in the clinical practice context. Building on Davis' emphasis on student learning styles, and that instruction should match cognitive abilities and comprise a variety of strategies, Lechasseur, Lazure, & Guilbert (2011) agree that the types of knowledge mobilized by the critical thinking process are essential to the overall development of critical cognitive skills.

Understanding students' learning and cognitive styles have the potential to impact nursing education in the area of critical thinking as instructors aim to choose appropriate learning activities based on identified cognitive styles.

In discussing ways to improve current methods to foster critical thinking in nursing students, Yildirim and Ozsoy (2011) proposed the use of theoretical knowledge integration, scenario exercises, and homework assignments. These authors conducted their study to ascertain the efficacy of intentionally focusing on developing critical thinking skills with a specific course, "Critical Thinking in Nursing," within the nursing curricula. They found that the students in the experimental group engaging in critical thinking activities such as searching for information, investigating problems, and seeking different options to solve problems, obtained higher scores for the final academic success grades than the control group resulting in a statistically significant difference ($r = 0.497$, $p = 0.001$). These results provided evidence that supports the development of critical thinking skills by embedding specific activities in the curriculum. In their discussion, Yildirim and Ozsoy (2011) indicated that one problem contributing to the lack of critical thinking skills among nurses was that there was a scarcity of specific cognitive-related courses in the education system.

Patient care outcomes and safety may be compromised if nurses are not experientially prepared to apply critical thinking skills to make appropriate clinical judgments. Ensuring patient safety is an important criterion for assessing quality. The Joint Commission of Health care Organizations (JCAHO) holds nurses accountable for all care given to patients and requires that nurses function as efficient health care providers. The goal of focusing on fostering critical thinking in nursing education is to prepare graduates to engage in safe and effective clinical decision making in practice. Benner et al. (2010) states, “new nurses need to be prepared to practice safely, accurately, and compassionately, in varied settings, where knowledge and innovation increase at an astonishing rate” (p. 1). The skill of problem solving that nurses are expected to use in any area of practice is priceless for providing quality patient care (Benner, 2010; Institute of Medicine, 2010).

In their study of the relationship between the ability to think critically and nursing competence using self-reports from the Watson-Glaser Critical Thinking Appraisal (WGCTA) and the Nursing Competence Scale (NCS), in a correlation, cross-sectional research design, Chang et al. (2011) found that critical thinking ability had a significantly positive correlation with nursing competence ($r = 0.32, p < 0.001$). This finding suggests that higher achievement of critical thinking skills resulted in a better the level of nursing competence. Regression results showed that 10% of the variance in nursing competence was explained by critical thinking ability ($F(1, 568) = 63.961, p = 0.001$). It seems rational then for Robert and Petersen (2013) to propose that critical thinking is the most important factor for decision making that encompasses a holistic approach to patient care. This includes attending to the environment, family, and social factors.

According to Kaddoura (2013), critical thinking “is an essential expected competency of nurses at all levels of education and practice” (p. 3). One common expectation of employers is that nurses are required to ‘think-on-their-feet’ and dispositions such as open-mindedness and inquisitiveness are needed to make sound clinical judgments in the assessment, diagnosis, planning, implementation, and evaluation of health care situations (Robert & Petersen, 2013).

Research suggests that to function with competency within the ever-changing health care system and provide quality patient care requires nurses to possess the ability to apply nursing theory to clinical nursing practice (Atay & Karabacak, 2012; Finn, 2011; Flanagan & McCausland, 2007; Robert & Petersen, 2013; Yildirim & Ozsoy, 2011). The association between critical thinking and competence has been cited in the literature (Banfield, Fagan & Janes, 2012; Ryan & Tatum, 2012; Saintsing et al., 2011), and continued advocacy to investigate the critical thinking process is essential to quality patient care.

The role of the nursing process in clinical reasoning development and problem-solving is familiar in nursing practice as a method to decipher patient care situations (Gonzol & Newby, 2013; Hagos, Alemseged, Balcha, Berhe, and Aregay, 2014). Although the nursing process provides a framework for deciphering patient care situations, and is comprised of five steps, namely assessing, diagnosing, planning, implementation, and evaluation some researchers have criticized its use. A quasi-experimental research study by Gonzol & Newby (2013) used an experimental approach to investigate the Identify, Relate, Understand, Explain, Predict, Influence and Control (IRUEPIC) reasoning model with the experimental group, and the traditional nursing

process method with lecture with the control group. Students in the experimental group used the reasoning model alone with no other method of instruction. The results showed higher statistically significant gains in all of the effective reasoning elements for the experimental group as follows: Identify ($p < .085$), Relate ($p < .041$), Understand/Explain ($p < .004$); Predict ($p < .005$), Influence ($p = < .031$), and Control ($p < .012$). This study also supported the fostering of clinical reasoning skills following the call by Benner et al. (2010) for nursing education to move beyond critical thinking and engage students in multiple ways of thinking.

A growing body of knowledge suggests a connection between critical thinking and evidence-based practice where decision making is guided by best evidence from scientific research (Balakas et al., 2011; Finn, 2011; Linton & Prasun, 2013; Majid et al., 2011; Spector, 2010). The National Council of State Boards of Nursing (NCSBN) place much emphasis on regulating nursing practice grounded on evidence-based practice and evidence-based education. This process is not only evident in nursing but also guides the use and dissemination of knowledge in medicine and allied health specialties under the general heading of evidence-based health care (Spector, 2010).

In conjunction with the purpose of this study, a discussion of evidence-based elements in nursing education is warranted. Kantor (2010) highlighted a Know-Be-Do (KBD) method that used evidence-based practice of a concept-based curriculum incorporated throughout the curriculum using techniques specifically aligned to develop critical thinking skills. This author switched from a didactic, content-saturated curriculum to integrate the nursing process using Carper's patterns of knowing model. Through reflection on holistic patient-centered care and on personal values and beliefs,

students assess, diagnose, plan, intervene and evaluate patient care. In the literature, reflection was identified as a strategy that promotes critical thinking development.

Evidence-based medicine defined by Sackett et al. in Spector (2010) is “the integration of best research evidence with clinical expertise and patient values” (p. 30). Majid et al. (2011) investigated the role of evidence-based practice in clinical decision making relating to nurses' perceptions, knowledge and barriers. Out of 1,486 full-time and part-time registered nurses who participated, more than 64% reported a positive attitude towards using evidence-based practice. The supporting factors identified in this study were training ($M = 3.90$); time to learn and implement evidence-based practice ($M = 3.88$); mentoring from nursing colleagues ($M = 3.86$); and support from management and access to resources for implementing evidence-based practice ($M = 3.79$). Significant relationships were found between perceived importance of evidence-based training and participation in previous training ($F(4, 1) = 7.03, p = 0.01$), years of nursing experience ($F(4, 2) = 15.46, p = 0.00$), and highest nursing qualification ($F(4, 3) = 7.30, p = 0.00$). These results validate the need for ongoing training and awareness of the value of evidence-based practice, especially where there may be new nurses or nurses who have not obtained terminal degrees.

Although extensive deliberation of critical thinking in actual nursing practice is beyond the scope of this study, one can argue that the foundation of critical thinking skills for nursing practice begins in the classroom and clinical settings. Thus, purposeful inclusion of evidence-based practice for fostering critical thinking in nursing students is essential to achieve accreditation standards and meet the needs of the health care system as a whole.

The current state of health care advances in the 21st century demands a change in educational strategies in nursing education. Some researchers and authors have argued strongly against traditional methods, such as lecturing, calling for an abandonment of these strategies (Weimer, 2015; Winters & Echeverri, 2012), while others have promoted interactive methods placing the learner in an active rather than a passive role (Finotto et al, 2013; Oja, 2011). Student-centered teaching strategies continue to gain attention in nursing education (Fahlberg, Rice, Muehrer, & Brey, 2014; Kong, Qin, Zhou, Mou & Goa, 2014; Wane & Lotz, 2013) as the demand grows for nurse educators to discover and use new ways to facilitate learning (Benner, 2015; Josephsen, 2014; de Oliveira, de Araujo, Diaz, & Monteiro da Cruz, 2015).

Active learning environments are becoming increasingly user friendly for both students and faculty as reported by Fahlberg et al., (2014) who related personal experiences of changing from the traditional mode of teaching to engaging students in the classroom. Using a Student-Centered Active Learning Environment with Upside-Down Pedagogies (SCALE-UP), where various activities including online lectures, group work, and independent reading of content, resulted in positive feedback from students who felt that this method improved critical thinking skills, communication, and teamwork.

Kaddoura (2013) sanctions the use of cooperative learning strategies and conducted a study with 86 sophomore nursing students using the Think-Pair-Share (TPS) active learning technique. Mean differences were compared between the control group and experimental group (12.43 and 42.9). Analysis using t-test indicate that the difference was significant ($t = 4.327$, $df = 78$, $p < 0.0001$). The author concluded that the increase in critical thinking score could be associated with the TPS strategy. Further *t*-test analysis

showed that critical thinking post-test were significant ($t = 3.437$, $df = 89$, $p = 0.0001$ and Mann-Whitney test ($z = 3.149$, $p = 0.002$) substantiating the claim that active learning strategies may contribute to critical thinking development.

One of the significant studies that points out the deficit in nursing education where new teaching methods are not being readily adopted, is Brown, Kirkpatrick, Greer, Matthias, and Swanson (2009). In a thorough literature search, Brown et al.'s (2009) study was the most recent investigation that specifically addressed the need to replace traditional rote methods with active participation and a learner-centered focus in an effort to foster the development of critical thinking skills. In their study of 946 nurse educators to investigate use of innovative pedagogies, 56% of the respondents identified the teacher-centered approach as the dominant teaching method with less than 20% using feminist or postmodern methods. Seventy percent of the respondents used evidence-based, lecture, discussion, case based and multimedia techniques in nursing education, and reported case-based (36%), evidence-based (21%), and client/patient (20%) as the most helpful pedagogical methods. Of importance to note is the finding that "while 78 percent of respondents used the lecture method, only 17 percent rated this traditional technique as one of their most helpful strategies for facilitating student learning" (Brown et al., 2009, p. 56).

Waltz, Jenkins & Han (2014) conducted a literature review on active learning strategies in nursing and health professions. In this review, a study by McCurry & Martins (2010) comparing traditional and innovative approaches to learning in a nursing research class, showed significant differences ($t = 6.93$, $p < 0.0001$) with students

reporting better achievement of course objectives, and rating innovative assignments higher than traditional methods.

Increased emphasis on critical thinking in nursing is crucial to meet the needs of present and emerging health care trends in nursing practice and education. Consequently, the development of critical thinking skills and the strategies that promote such have been widely discussed in the nursing literature (Davis, 2013; Freed & McLaughlin, 2013; Glasgow et al., 2010; Kong et al., 2014; Kowalczyk, 2011; Patterson & Klein, 2012; Weitzel, Walters, & Taylor, 2012). The methods purported in the literature that have been associated with critical thinking development include problem-based learning – PBL (Kong et al., 2014; Kowalczyk, 2011; Oja, 2011; Tiwari, Lai, So, & Yuen, 2006); simulation (Boellaard, Brandt, Johnson & Zom, 2014; Goodstone et al., 2013; Kriek & Stols (2010); Park et al., 2013; Wane & Lotz, 2013); concept mapping (Atay & Karabacak, 2012; Maneval, Filburn, Deringer, & Lum, 2011), and reflection and journaling (Josephsen, 2013; Marchigiano, Eduljee & Harvey, 2011). Other methods such as role playing, debating, and questioning, have also been identified as methods for enhancing critical thinking skills (Brown, et al., 2009; Healey, 2012; Mann, 2012).

Phillips and Vinten (2010) conducted a study to examine why clinical nurse educators adopted innovative teaching strategies and found that out of a sample of 71 clinical nurse educators all of the respondents agreed that innovative strategies needed to be adopted. Using quantitative measures from a researcher-made instrument, the respondents rated their intent to adopt innovative teaching strategies based on Bonk and Kim's (1998) sociocultural teaching strategies, that revealed the following: role modeling ($M = 4.61$, $SD = 0.78$), exploration ($M = 4.60$, $SD = 0.71$), articulation ($M = 4.59$, $SD =$

0.73), reflection ($M = 4.58$, $SD = 0.73$), managing instruction ($M = 4.52$, $SD = 0.79$), guidance ($M = 4.48$, $SD = 0.89$), cognitive task structuring ($M = 4.44$, $SD = 0.81$), questioning ($M = 4.37$, $SD = 0.81$), direct instruction ($M = 4.35$, $SD = 0.81$), and coaching ($M = 4.11$, $SD = 0.79$). In the qualitative analysis of the data, specific strategies such as concept mapping, case studies using simulation, and critical thinking clinical assignments were identified as techniques educators intended to adopt in delivering nursing content.

A review of the literature shows problem-based learning (PBL) has been extensively reported as a method to facilitate critical thinking. Winters and Echeverri (2012) in discussing teaching strategies that support evidence-based practice, proposed PBL as an evidence-based practice teaching method and stressed the need for problem-based learning to be integrated across the nursing curriculum. This recommendation is evident in the literature. The results of a systematic literature review of 19 studies following the PRISMA method was conducted by Kowalczyk (2011). Overall, the results of the review indicated improvement in problem-solving skills through the use of PBL strategies. Although many studies have supported the use of PBL methods to improve critical thinking, the majority focused on critical thinking dispositions (inquisitiveness, truth-seeking, open-mindedness, self-confidence) and not on skills such as analyzing, interpreting, explaining, to mention a few. Therefore, any application made about the role of problem based learning on fostering critical thinking skills in this review was limited.

In reviewing the use of PBL in a collection of studies to improve critical thinking in nursing students, Oja (2011) cited research that provide evidence that PBL techniques

improve critical thinking ability in both the classroom and clinical setting. Such studies included Ozturk, Muslu, and Dicle (2008) who found a statistically significant difference in the scores from the PBL group versus the traditional approach group to learning with an overall effect size of 0.21; and Jones (2008) who explored the impact of PBL in clinical settings for critical thinking and communication skills in associate degree nursing students using Bloom's taxonomy. Two groups were used in Jones' (2008) study, one as a control group using a lecture approach and the other an intervention group using PBL. Effect sizes for the cognitive learning domain levels – knowledge $d = 0.52$, comprehension $d = 0.31$, application $d = 0.36$, analysis $d = 0.07$, synthesis $d = 0.25$, and evaluation $d = 0.11$ indicated that there was a significant increase in critical thinking ability for the group who used PBL intervention strategies.

Another study cited by Oja (2011) is Yuan et al. (2008) who examined the effect of PBL on critical thinking skills of undergraduate nursing students in a classroom setting. Two groups, one receiving the lecture method and the other given PBL activities, completed the California Critical Thinking Skills Test (CCTST) at the beginning and end of a course. The results showed that there was a significant improvement in the critical thinking test scores for the PBL group with an effect size of 0.76.

One of the most current and popular pedagogical innovations in nursing education is the use of high-fidelity simulations that afford nursing students the opportunity to operate in a 'real-life' situation finding solutions for 'real-life' patient problems (Goodstone et al., 2013; Kalmakis et al., 2010; Park et al., 2013). Boellaard et al. (2014) conducted a descriptive, mixed method, survey study with 17 baccalaureate nursing students in an accelerated program who used simulation to learn about patient care. This

study showed that students reported simulation as being very helpful in improving skill performance and thinking through patient teaching, delegating, and documenting while learning about patient care and had high mean scores ($M = 4.31$) for physical assessment, and ($M = 5.24$) for cardiac patient care on a 1-6 modified semantic differential scale with (1) minimally helpful to (6) very helpful.

In their review of eleven quantitative studies on simulation-based instruction and critical thinking in nursing students, Cant and Cooper (2010) found 5 (45%) studies including one conducted by Shepherd et al. (2007), that reported statistically significant scores showing evidence that simulation is an effective tool for improving critical thinking skills. In this study, the mean test scores for critical thinking were statistically significant and approximately 11% higher for the group exposed to simulation activity (135.52, $p < 0.001$) vs other groups not exposed (107.42) or (102.77). Although six studies showed gains in areas of knowledge, critical thinking, satisfaction or confidence compared with the control group, other studies reported no statistically significant difference between critical thinking and simulation-based instruction.

The National Council of State Boards of Nursing (2010) recognized the advancement of high fidelity simulation in nursing education and conducted a longitudinal study of simulation use in pre-licensure nursing programs in the United States. This study concentrated on measuring students' knowledge, competency, and critical thinking based on simulation learning experience exposure. The first research question was 'Does substituting clinical hours with 25% and 50% simulation impact educational outcomes (knowledge, clinical competency, critical thinking, and readiness for practice) assessed at the end of the undergraduate nursing program?' To report on the

critical thinking aspect, students were rated by preceptors and instructors on their ability to think critically on a 1-6 scale with (1) low rating and (6) high rating. Chi-square analysis of critical thinking showed no statistically significant differences between three groups – control group, 25% group and 50% group (Total mean = 5.07, $SD = 0.76$; Control mean = 5.11, $SD = 0.72$; 25% group mean 5.06, $SD = 0.71$; 50% group mean 5.03, $SD = 0.88$); $F = 0.40$, effect size = 0.10, $p = 0.668$. However, the end-of-program survey student ratings showed statistically significant results for critical thinking (control mean = 5.13, $SD = 0.7$; 25% group mean 5.10, $SD = 0.7$; 50% group mean = 5.30, $SD = 0.9$; $p = 0.038$).

A critical thinking diagnostic that measured problem recognition, clinical decision making, prioritization, clinical implementation and reflection revealed statistically significant differences among the groups. One main implication that emerged from this study comes from the feedback of instructors and preceptors that the use of simulation for learning is transferred to nursing practice in the clinical setting. This outcome of transfer of learning indicates the usefulness of simulation instruction.

In Wane and Lotz's (2013) exploration of critical thinking in a simulated clinical setting, students felt that their critical thinking and clinical judgment skills were enhanced through clinical simulation scenarios and activities. In discussing the advantages of using simulation in clinical situations for nursing students, these authors noted that although much has been written about the positive outcomes of this method, little was found about student involvement in creating, implementing, and evaluating the simulated clinical scenarios. Using a learner-centered focus, the researchers sought to explore the learning

experiences of nursing students who developed and implemented their own patient scenarios for simulation as a method to develop critical thinking skills.

Wane and Lotz (2013) emphasized the need for nursing students to play a more participatory role in their learning. Based on their review of the literature, Wane & Lotz concluded that simulation was an effective method that helped students connect theory to practice. The secure environment of simulation practice allows students to engage in critical thinking, hands-on implementation of nursing skills, and evaluation of the care plan without the threat of hurting an actual patient. As a result of the benefits of this method, Wane and Lotz identified simulation as an ideal strategy for the development of essential critical thinking skills and clinical judgment. Simulation, according to these researchers, also helps students to use self-reflection, an important element of critical thinking.

Concept mapping has been noted to promote the use of higher order thinking and cited as a method to facilitate critical thinking (Moattari, Soleimani, Moghaddam, & Mehbodi, 2014). In their quasi-experimental post-test only study on the effect of concept mapping on critical thinking of nursing students in medical surgical and pediatric clinical rotations, Moattari et al. (2014) found that the experimental group excelled in all areas of critical thinking. Specifically, in the evaluation criteria category the experimental group had the following results: identification ($M = 19.63$, $SD = 10.03$); justification ($M = 8.7$, $SD = 5.15$); and quality ($M = 10.6$, $SD = 0.57$). On the other hand the control group's results were as follows: identification ($M = 7.13$, $SD = 4.45$); justification ($M = 1.8$, $SD = 2.25$); and quality ($M = 3.07$, $SD = 3$). Critical thinking skills dimensions for the experimental group that were higher than the control group were analyzing ($M = 2.09$, SD

= 1.81); logical reasoning ($M = 2$, $SD = 2.09$); discrimination ($M = 2.45$, $SD = 2.06$); applying standards ($M = 2.72$, $SD = 1.90$) and transforming knowledge ($M = 3.9$, $SD = 1.92$).

To apply concept mapping to the context of nursing education, Atay and Karabacak (2012) studied how nursing students' critical thinking dispositions were impacted by the use of concept maps. Using a sample of freshman and sophomore nursing students, these researchers used concept mapping for care planning with an experimental group and compared results with the control group who received no intervention. Pre- and post-test scores for the California Critical Thinking Disposition Inventory (CCTDI) were correlated with each subscale of critical thinking dispositions for both groups. The results showed a statistically significant difference between the scores of the experimental group and the control group ($t = 5.37$, $p = < 0.05$). Consequently, these researchers concluded that concept mapping helps to improve critical thinking in students.

Many studies have reported the use of a combination of evidence-based teaching strategies. One such exploratory correlational study was conducted by Samawi, Miller, and Haras (2014) who investigated the use of high-fidelity simulation and concept mapping in a sample of 48 nursing students in a pediatric clinical rotation. This study found that in the area of self-confidence ($M = 35.67$, $SD = 7.62$) and satisfaction ($M = 71.02$, $SD = 10.42$), mean scores showed that these were improved as result of using this combined method. Critical thinking improvement emerged as a theme from the focus group discussion and showed positive gains from the responses given.

In spite of the positive reports on the use of concept mapping, not all studies found a positive relationship between concept mapping and critical thinking development. In a study inquiring about the use of concept mapping to improve critical thinking while planning care, Maneval et al. (2011) aimed to determine the effectiveness of concept mapping as an instructional tool compared to a traditional care plan format. Using students from two campuses, the National League for Nursing Critical Thinking in Clinical Nursing Practice PN Examination was used to test critical thinking ability, and t-test of independent samples was used to assess the difference between the scores of the experimental group and the control group. The results showed that students who were taught using the traditional care planning strategy had higher statistically significant scores than those who were taught using the concept map method ($t [150] = 2.538, p = 0.012$); the mean score for the traditional group was 95.93 and for the concept mapping group 92.12.

In a pilot study, Marchigiano et al. (2011) explored the use of journaling for clinical assignments compared to the traditional care plan to foster critical thinking skills in a descriptive cross-sectional design. Using paired t-tests and Wilcoxon's matched pairs signed ranks, the researchers measured perceived confidence based on seven critical thinking skills of analyzing information, making connections, determining relevance, setting priorities, selecting appropriate information, applying relevant knowledge, and evaluating outcomes. The scores were correlated with two variables, care plan and journal format, resulting in a more favorable result for journaling ($M = 2.29, SD = 0.692$) compared to the care plan format ($M = 3.41, SD = 1.13$). Overall, in skills such as selecting appropriate information, and making connections, journaling is an effective

method to improve critical thinking skills in nursing students. Findings also showed that perceived confidence in using the seven critical thinking skills increased with the journaling format ($t [50] = 5.67, p = 0.0001$).

In a study examining the role of reflection in critical thinking Josephsen (2013) found that 82% of students in spring and 95% in fall agreed/strongly agreed that a narrative reflection exercise promoted active self-reflection and facilitated integration of knowledge. In the process of integration of knowledge students were actively engaged in critical thinking activities.

Debating has been identified as a teaching/learning strategy that promotes the development of critical thinking skills (Healey, 2012). Healey (2012) supports the role of debating in fostering critical thinking skills. In an article on the power of debate, she provides narrative feedback from students about the effectiveness of this method. Students reported that debating helped to improve their critical thinking skills to include evaluating, analyzing, reflecting, and making inferences.

Weitzel et al. (2012) proposed direct instruction, simulation, modified lectures, case-based teaching, and modeling as key teaching methods that need to be infused in pharmacy programs to develop problem-solving skills. A small number of research studies strongly support using role modeling to promote development of critical thinking skills in students (Davis, 2013; Mann, 2012; Winters & Echeverri, 2012). For nurse educators, role modeling critical thinking skills is emphasized as a strategy to assist in developing critical thinking in students (Davis, 2013). Winters and Echeverri (2012) argues that faculty should teach by example and act as role models in displaying critical thinking skills as they aim to integrate evidence-based methods into their practice.

Issues in Critical Thinking

The development of critical thinking skills in students is a requirement of a variety of educational programs; however, some educators may not be using the most effective teaching methods to foster critical thinking for many reasons. Choy and Cheah (2009) conducted a qualitative study with teachers in higher learning institutions to determine teacher perceptions of critical thinking and the influence on higher education. Three areas formed the main focus of this study: teachers' perception of critical thinking, teachers' perception of students' critical thinking ability, and teachers' perception of their role in integrating critical thinking in instruction. This study revealed that out of 30 teachers who responded, none appeared to have a solid understanding of critical thinking.

Kowalczyk et al.'s (2012) study investigating radiologic science program directors' competence level in teaching and assessing critical thinking skills shows that "only 37% of the respondents indicated they felt confident in their abilities to teach critical thinking, and only 39% indicated they could model critical thinking behaviors" (p. 230). ANOVA and correlation coefficient were used to analyze the data. No significant relationship was found between the directors' education level and perception of the importance of critical thinking ($r = 0.009$, $p = .9$). However, there was a statistically significant difference between level of confidence in critical thinking and level of skill ($r = 0.8$, $p \leq .001$). Based on educational level, a statistically significant difference was found for perceived confidence (mean difference = 0.6, $p = .05$) and skill level (mean difference = 0.4, $p = .03$). These researchers noted that one problem was the

continued use of traditional instruction methods that did not adequately address stimulation of creative and clinical thought.

Common threads in the nursing literature showed barriers to using critical thinking teaching methods such as insufficient time to cover material, students' focus on achieving grades over learning and understanding content, lack of student motivation to engage in critical thinking, and insufficient time for instructors to learn critical thinking teaching skills. Wangenstein et al. (2010) investigated the critical thinking dispositions among 614 newly graduated nurses using a cross-sectional descriptive study design. The results showed that 80% of the participants had positive dispositions towards critical thinking. On the California Critical Thinking Dispositions Inventory, the inquisitiveness subscale received the highest mean score ($M = 48.0$, $SD = 5.67$) and truth-seeking received the lowest ($M = 39.4$, $SD = 5.85$). The latter result was concerning to the authors because this score indicated that the nurses lacked courage to ask questions and were satisfied with the status quo. They suggested that this low score may be associated with using traditional teaching methods in nursing education, and urged educators to use active learning techniques in their instruction.

Other, yet similar barriers that have been identified in the literature include institutional conditions (Patterson & Klein, 2012), insufficient time to implement new methods, lack of knowledge to teach critical thinking skills, student expectation of lecture format (Kowalczyk et al., 2012), inability to name critical thinking skills and explain how to foster critical thinking in the classroom while covering content, and the inability to give one's concept of critical thinking. Del Bueno (2005) reporting on aggregate results of new graduate preparedness for nursing practice asked the thought provoking question

“Why are so many women and men, bright enough to meet academic entry and exit requirements and pass state licensing requirements, not able to accurately identify and/or safely manage patients’ problems?” (p. 280). This report showed that “only 33 percent of new RN graduates, regardless of education preparation and credentials, meet entry expectations for clinical judgment” (p. 278). The new graduates were given patient focused uncued exercises to decipher and 65% to 76% did not meet the expected clinical judgment performance for entry-level nursing practice.

The effects of the perceived barriers to fostering critical thinking have manifested in the area of nursing practice. New graduate nurses are entering practice not adequately prepared to handle the complexities of patient care (Ryan & Tatum, 2012). According to Ryan and Tatum (2012) new nurses are not displaying the expected level of critical thinking skills needed in the real clinical setting. In relation to demographic variables of age, education, and previous pediatric nursing experience, no statistically significant results were obtained in Ryan and Tatum's (2012) study. However, the mean score obtained on the HESI Critical Thinking test was below the minimum range set by HESI and the deficits noted on the test were reflected in clinical performance. Results of this study strongly suggests that nursing education must be transformed to meet the needs of clinical practice and ensure that entry-level skills are mastered.

Fero et al. (2008) investigated the critical thinking ability of new graduate and experienced nurses from three areas of academic preparation, namely BSN, Associate, and Diploma. Using a Performance Based Development System (PBDS) assessment that included testing clinical judgment, these researchers found that 74.9% of the newly hired nurses met expectations on the PBDS. Statistically significant relationships between the

level of preparation and critical thinking ability expectations were found – associate degree ($X^2 = 12.085$, $df = 3$, $p = 0.007$), baccalaureate ($X^2 = 18.498$, $df = 3$, $p < 0.0001$) based on experience. However, areas of deficiency were noted in those who did not meet the expectations ($n = 436$, 81% with 29.6% prepared at the baccalaureate level). These deficiencies included failure to recognize problems (57.1%), failure to report relevant and crucial clinical data (65.4%), failure to identify and use appropriate nursing interventions (97.2%), failure to anticipate appropriate medical orders (62.8%), failure to characterize urgency (67.0%), and failure to provide reasons for decisions made (62.6%). Overall, approximately 25% of new graduates experienced deficiencies in critical thinking abilities and were unable to meet the required expectations of clinical judgment in clinical scenarios compared to more experienced nurses.

A study conducted by Chang et al. (2011) on the critical thinking skills of clinical nurses indicated that nurses who had more experience were more proficient in using critical thinking skills to solve patient care problems ($p = 0.112$) than less experienced nurses. The results of this study reveal that experience among other variables such as position and educational level influenced critical thinking ability on nursing competence. These findings have implications on how teaching and evaluation of critical thinking is addressed in nursing education.

Since educators play a vital role in the development of critical thinking skills in students, Kowalczyk et al. (2012) stressed that educators should reflect on teaching methods, utilize critical thinking strategies, and upgrade their knowledge about critical thinking. The authors stated “When educators lack strong critical thinking skills, they cannot model this behavior to students” (p. 232). Since teachers’ beliefs, attitudes, and

perceptions impact the way they teach, it is imperative that factors that influence teaching behavior be investigated. These authors also emphasized the importance of active student engagement through the use of educational strategies that require problem-solving. However, they caution, “active engagement in the classroom does not necessarily lead to the development of critical thinking skills” (Kowalczyk et al., 2012, p. 232).

Summary

The need for critical thinking in nursing education and nursing practice has been widely established as an essential competency needed to execute efficient nursing care in a multicultural society. The essential skills of analysis, interpretation, evaluation, and self-regulation, as a review of the literature has pointed out, need to be addressed and developed in the classroom and clinical settings. Further development of these skills should continue on entering clinical practice and advance with experience.

With the report of new graduates entering practice without essential critical thinking skills (Ryan & Tatum, 2012; Spector 2010), the field of nursing education must scrutinize methods nurse educators are using for instruction and also to lobby for transitional programs to prepare nursing students to enter clinical practice. The literature has identified evidence-based teaching strategies as well as issues related to effectively implementing these strategies in teaching. Focusing on examining factors that impact intention and integration of instructional strategies will be beneficial to the field of nursing education.

The current study's focus on examining the relationship among factors that influence intention to use critical thinking teaching strategies that are evidence-based for critical thinking development, and the effect of intention to use on actual use related to demographic and psycho-social behavioral attributes is necessary. The information that this study provides may help shape how nurse educators are prepared for teaching practice as well as influence pedagogical methods in nursing education. The use of the TPB model to predict the relationships between the determinants of intention and intention to use, as well as between intention to use and actual use, provide a new dimension for analyzing educational practice in the discipline of nursing.

CHAPTER III

METHODOLOGY

Introduction and Overview

Critical thinking in nursing education has been recognized as an essential competency for preparing student nurses for the complexity of health care in the 21st century. The skills of critical thought that include analysis, interpretation, evaluation, explanation, and self-regulation are required by nurses to provide safe and effective patient care (Benner et al., 2010; Chang, et al., 2011; Lorenz, 2010; Robert & Petersen, 2013). Nurse educators are challenged to create learning experiences and environments that foster critical thinking skills (Allen, 2013; IOM, 2011; Steiner, Hewett, Floyd, Lewis & Walker, 2010). Nursing practice that is driven by evidence further guides the execution of tasks in practice and education.

The purpose of this study was to examine the relationships between the factors that influence nurse educators' intention to use evidence-based critical thinking teaching strategies and the impact of intention to use on actual use for fostering critical thinking in baccalaureate degree nursing students. This examination was based on educator demographic characteristics and psycho-social behavioral traits of attitude, subjective norm, and perceived behavioral control. The intent of this chapter is to describe the methodology that was used to examine the relationships described above. The

description that follows includes the research design, population and sample, instrumentation, data collection methods, and data analysis.

Research Design

To address the relationship between the dependent variable nurse educators' intention to use EBCT teaching strategies for critical thinking, and independent variables (a) educator characteristics, (b) attitude toward intention to use EBCT teaching strategies, (c) subjective norm related to intention to use EBCT teaching strategies, and (d) perceived behavioral control influencing intention to use EBCT teaching strategies, a quantitative, non-experimental correlational survey and cross-sectional research design was used. The relationship between intention to use EBCT teaching strategies and actual use also followed a quantitative approach to obtain data. The constructs for this research were chosen from the theoretical framework of the Theory of Planned Behavior (TPB) found in the literature and influenced by research relating to teacher intention.

Quantitative research according to Creswell (2014) is “an approach for testing objective theories by examining relationships among variables” (p. 4). This approach involves measurement of variables to produce numerical data that are analyzed through statistical methods. Statistical sampling procedures provide essential information that facilitates generalizability of the data. For the purpose of this study, a quantitative design inquiry is suitable in order to provide valid information to answer the research questions about educator intention related to teaching strategies for critical thinking and actual use of these strategies.

Non-experimental research designs according to McMillan & Schumacher (2010), involves description of phenomena and examination of existing relationships between variables without any manipulation of the variables. One of the categories of non-experimental research according to Grajales (2013) is correlational research that is conducted to “look for and describe relationships that may exist among naturally occurring phenomena, without trying in any way to alter these phenomena” (p. 127). In the current study no conditions were manipulated or altered, and only relationships between the variables were examined. Survey design has been used often in educational research to investigate different types of information including attitudes and beliefs (McMillan & Schumacher, 2010). This study used survey because it was an effective method to gather information about the psycho-social behavioral attributes of the sample and suitable for the topic of educator intention. Advantages of the survey method including low cost, ease of use, and ability to survey a large number of people were also considered and deemed acceptable to gather data for this study.

Population

The target population for this study was comprised of nurse educators who teach in accredited 4-year baccalaureate degree nursing programs in the southeast region of the United States including Alabama, Florida, Georgia, Kentucky, Tennessee, Mississippi, South Carolina, North Carolina, Virginia and West Virginia. Inclusion criteria for the sample were that the nurse educators would have achieved a master’s degree or higher in nursing, nursing education, or related health field required for nursing faculty, and teach in various areas of specialty in both didactic and clinical areas at the time of the survey.

Sampling Procedure and Selection of Participants

The question regarding a sample's adequate representation of the characteristics of a population from which the sample is drawn is essential to a research study. In order to obtain reliable results, an appropriate sample size must be secured. Fowler (2009) advised that sample size determination should relate to the analysis technique for a study. Therefore, guidelines for sample size requirement were based on the Structural Equation Modeling (SEM) statistical analysis technique chosen for this study. To obtain reliable results when using SEM, many researchers have agreed that a sample size of 200 is adequate to test a model (Buhi, Goodson, & Neilands, 2007; Kenny, 2014; Kline, 2011). Based on this recommendation, the researcher desired to obtain 200-250 responses to facilitate a strong structural equation modeling analysis.

The sampling procedure identified for this study was stratified sampling in that the 4-year nursing programs within ten states in the southeast region of the United States were put in groups based on the geographical region. This was done to provide a viable population of nurse educators from the states in this region from which an adequate sample can be drawn. Creswell (2014) endorses the stratification random sampling method for the ability to increase estimate preciseness and narrow confidence intervals. Probability sampling designs have been found to be effective because (a) the results can be generalized to the specific population under study, and (b) estimates about what is true regarding the population can be derived from a smaller number of individuals (McMillan & Schumacher, 2010).

The nursing programs used for grouping were located through an internet search of registered nursing baccalaureate programs in the southeast United States and chosen based on accreditation status and close geographical proximity to the researcher's location. The two accrediting agencies for nursing programs in this area as shown from the search are the Commission on Collegiate Nursing Education (CCNE) or the Accreditation Commission for Education in Nursing (ACEN). The names of the universities or colleges that offered 4-year nursing degree programs accredited by either the (CCNE) or (ACEN) were printed, separated, and placed in ten containers representing each state. Nine schools within each of the ten states making a total of 90 were randomly selected from each container for inclusion in the sample out of the approximate total of 150 baccalaureate nursing programs retrieved from the bestnursingdegree.com website.

Participants were selected using a list-based sampling frame. According to Fricker (2008) using a list-based sampling frame for internet-based surveys is practical because this method allows email addresses of individuals in large organizations like universities to be assembled in a fairly easy manner. Thus, an email list of the chairs/deans/directors of the nursing departments in the approved institutions was compiled. A total of 755 invitations containing the survey link were sent to nursing faculty in ten states in the southeast region of the United States. Considering factors such as low-response rates and technological problems, this method was used in order to obtain the required sample size of 200-250 for robust SEM analysis.

Hypotheses

The main objective of this study was to examine the relationship between factors that influence nurse educators' intention to use critical thinking teaching strategies and the impact of intention to use on actual use of these instructional methods. Demographic variables/educator characteristics of ethnicity, number of years teaching nursing, educational level, and training in critical thinking and the determinants of intention, namely attitude toward using EBCT teaching strategies, subjective norm related to using EBCT teaching strategies, and perceived behavioral control influencing use of EBCT teaching strategies provided the framework for analysis of the data for this study that focused on one main null hypothesis ($H1_0$) and five null sub-hypotheses ($SH1_0 - SH5_0$). The alternate hypotheses are presented below each null hypothesis.

$H1_0$. The covariance matrix represented by the hypothesized model is equal to the covariance matrix of the empirical covariance matrix.

$H1_a$. The covariance matrix represented by the hypothesized model is not equal to the covariance matrix of the empirical covariance matrix

$SH1_0$. There is no direct effect of educator characteristics on intention to use EBCT teaching strategies for critical thinking.

$SH1_a$. There is a direct effect of educator characteristics on intention to use EBCT teaching strategies for critical thinking.

$SH2_0$. There is no direct effect of attitude on intention to use EBCT teaching strategies for critical thinking.

$SH2_a$. There is a direct effect of attitude on intention to use EBCT teaching strategies for critical thinking.

SH3₀. There is no direct effect of subjective norm on intention to use EBCT teaching strategies for critical thinking.

SH3_a. There is a direct effect of subjective norm on intention to use EBCT teaching strategies for critical thinking.

SH4₀. There is no direct effect of perceived behavioral control on intention to use EBCT teaching strategies for critical thinking.

SH4_a. There is a direct effect of perceived behavioral control on intention to use EBCT teaching strategies for critical thinking.

SH5₀. There is no direct effect of intention to use EBCT teaching strategies for critical thinking and actual use.

SH5_a. There is a direct effect of intention to use EBCT teaching strategies for critical thinking and actual use.

Definition of Variables

The independent variables in this study that addressed the demographic educator characteristics were ethnicity (ethni), number of years teaching nursing (yrs_tea), education level (edu_lvl), and training in critical thinking (train_ct). The operational definitions for these variables are as follows:

The operationalization of *Ethnicity* (ethni) was measured on a categorical measurement scale with 6 categories as follows: 1 = White, Caucasian; 2 = Asian, Asian American, Pacific Islander; 3 = Black, African American; 4 = Hispanic, Latino; 5 = American Indian, Native American, and 6 = Other.

Years of teaching nursing (yrs_tea) was measured on a categorical measurement scale with 6 categories: 1 = 1 to 2 years; 2 = 3 to 5 years; 3 = 6 to 10 years; 4 = 11 to 15 years, and 5 = More than 15 years.

Educational attainment level (edu_lvl) was measured on a categorical measurement scale with two categories: 1 = Master's; 2 = Doctorate.

Training in Teaching Critical Thinking (train_ct) was measured on a categorical measurement scale with two categories: 1 = Yes; 2 = No.

The independent variables in this study that addressed the psycho-social behavioral characteristics as determinants of intention are: (a) attitude toward using EBCT teaching strategies, (b) subjective norm related to using EBCT teaching strategies, and (c) perceived behavioral control influencing use of EBCT teaching strategies. The operational definitions for these variables in context of the study are as follows:

Attitude toward using EBCT teaching strategies was operationally defined from the responses to items on a continuous measurement scale with a range of 4 to 20. The score was derived by calculating the sum total of questions 2, 4, 13, and 17 from the 'Intention to Use Questionnaire'. Response choices to the survey questions was recorded using a 5-point scale and coded as 1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Neither Agree nor Disagree*; 4 = *Agree*, and; 5 = *Strongly Agree*. Larger scores indicate a more positive attitude toward using EBCT teaching strategies, while smaller scores indicate a less positive attitude toward using EBCT teaching strategies. An example of an item that measured this variable is 'My using EBCT teaching strategies for critical thinking development in nursing students this school year is valuable'.

Subjective norm was operationally defined by items on a continuous measurement scale with scores ranging from 11 to 55. The score was derived by calculating the sum total of questions 3, 5, 9, 11, 15, 19, 20, 21, 23, 24, and 26. Response choices to the survey questions was coded as 1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Neither Agree nor Disagree*; 4 = *Agree*; and; 5 = *Strongly Agree*. Thus larger scores indicate greater alignment with subjective norm relating to social pressure and approval of others regarding use of EBCT teaching strategies, while smaller scores indicate less alignment with subjective norm toward using EBCT teaching strategies. An example of an item that measured this variable is ‘Most people who are important to me professionally think I should use EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students this year’.

Perceived behavioral control was named Perceived Behavioral Control influencing use of EBCT Teaching Strategies that was operationally defined by items on a continuous measurement scale with a range of 8 to 40. The score was derived by calculating the sum total of questions 6, 7, 8, 12, 16, 18, 22, and 25. Response choices to the survey questions was coded as 1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Neither Agree nor Disagree*; 4 = *Agree*, and; 5 = *Strongly Agree*. Questions 8, 12, 22, and 25 were reverse coded prior to computing the score. Thus, larger scores indicate greater perceived behavioral control influencing use of EBCT teaching strategies while lower scores indicate less perceived behavioral control influencing use.

In relation to PBC, Ajzen (1991) states that resources, opportunities, enhancers, barriers, and the amount of control a person perceives he or she has over performing the behavior are all factors that influence PBC. Therefore, the items that relate to perceived

behavioral control focused on perception of ability, level of confidence, perceived control over the behavior, and perceived enhancers or barriers to using EBCT teaching strategies. An example of an item that measured this variable is ‘I am confident that I can use EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students this school year’.

The dependent variables in this study (intention to use and actual use) were operationally defined as follows:

Intention to use, the dependent variable, was measured on a continuous measurement scale with a range of 3 to 15. The score was derived by calculating the sum total of questions 1, 10, and 14 from the Intention to Use Questionnaire. Response choices to the survey questions was coded as 1 = *Strongly Disagree*; 2 = *Disagree*; 3 = *Neither Agree nor Disagree*; 4 = *Agree*, and; 5 = *Strongly Agree*. Thus, larger scores indicate greater intention to use EBCT teaching strategies while smaller scores indicate lesser intention to use EBCT teaching strategies.

Actual Use of EBCT Teaching Strategies was measured on a continuous measurement scale with a range of 8 to 40. The score to determine frequency of use was derived by calculating the sum total of questions 27, 28, 29, 30, 31, 32, 33, and 34 from the ‘Intention to Use Questionnaire’. Response choices to the survey questions was coded as 1 = *Never*; 2 = *Rarely*; 3 = *Sometimes*; 4 = *Often*; and 5 = *Always*. Thus, larger scores indicate greater frequency of using EBCT teaching strategies while lower scores indicate less frequent use of EBCT teaching strategies.

Instrumentation

A quantitative cross-sectional questionnaire survey method was used to gather data about the relationships between the independent and dependent variables that was tested in the proposed hypothesized model. The survey method was used because this method provides the researcher with a more accurate way to appraise data about the sample, make inferences about attributes of the population, and generalize research findings (Creswell, 2014). Advantages of the survey method according to Fricker (2008) include “lower cost, less effort to administer, better response rates and greater accuracy” (p. 196).

The 34-item ‘Intention to Use Questionnaire’ that sought to elicit responses from nurse educators about intention to use critical thinking teaching strategies that are evidence-based for critical thinking based on educator experiences and psycho-social behavioral characteristics was created based on validated scales and instruments previously used in research (Teo & Lee, 2010; Sadaf et al., 2012). The questionnaire specifically focused on finding out nurse educators’ intention to use EBCT teaching strategies based on (a) attitude toward using EBCT teaching strategies, (b) subjective norm regarding the level of social pressure and individuals who influence whether or not nurse educators use EBCT teaching strategies, and (c) perceived behavioral control about one’s ability, confidence, impediments, or enhancers related to using EBCT teaching strategies. In addition, nurse educators were asked to indicate actual use of EBCT teaching strategies.

In the first portion of the questionnaire, the participants were asked to provide information about background factors such as ethnicity, years of teaching nursing,

educational level, and training in teaching critical thinking. Ethnicity was grouped to identify participants who were White, Caucasian; Asian, Asian American, Pacific Islander; Black, African American; Hispanic, Latino; American Indian, Native American; and Other. Years of teaching nursing required participants to indicate those who have been teaching for 1-2 years, 3-5 years, 6-10 years, 11-15 years, and more than 15 years. Educational attainment level identified the participants who had achieved education at the masters or doctoral level. The question on training elicited information about whether or not participants were trained to teach critical thinking.

The second portion contained items for each of the constructs in the hypothesized model that were interspersed throughout the questionnaire. In order to investigate key constructs of the study, nurse educators were asked to respond to questions measuring intention, attitude, subjective norm, and perceived behavioral control as they relate to using EBCT teaching strategies. These data are necessary to test the hypothesized model based on the Theory of Planned Behavior to determine a fit with the observed data. These items were measured on a 5-point level of agreement Likert-type scale with (1) *Strongly Disagree*, (2) *Disagree*, (3) *Neither Agree or Disagree*, (4) *Agree*, and (5) *Strongly Agree*.

The third part of the questionnaire consisted of items to which the participants responded indicating frequency of using specific EBCT teaching strategies to include concept mapping, reflection papers, simulation, role modeling, coaching, case studies, journaling, and debating. Information about actual use of EBCT teaching strategies was gathered in order to test the relationship between intention to use and actual use depicted on the theoretical model.

Since the TPB was used to investigate the influence of the central constructs of intention to use (attitude toward using EBCT teaching strategies, subjective norm relating to use of EBCT teaching strategies, and perceived behavioral control influencing use of EBCT teaching strategies), the researcher adapted the instructions from Ajzen (1991), and Fishbein & Ajzen (2010) for creating a Theory of Planned Behavior (TPB) Questionnaire. The researcher used the TPB framework to construct a model to examine the relationship among (a) the three determinants of attitude, subjective norm, and perceived behavioral control and nurse educators' intention to use EBCT teaching strategies, and (b) intention to use EBCT teaching strategies and actual use of these techniques. Following the guidelines for constructing a TPB questionnaire and using the foundation of research questions and hypotheses of this study, specific questions were formulated for each construct.

The wording for the 34 items that elicited information about the variables in this study were adapted from the literature on teacher intention and behavior and based on Ajzen's (2006) and Fishbein and Ajzen's (2010) recommendations, as well as nurse educator comments expressed in faculty meetings, conversations, and from discourses at professional gatherings.

The reliability and validity of this instrument have been documented. The measurement scales used on this instrument were based on previously validated instruments. The majority of the items in this study have been used in previous studies on teacher intention, and were found to be reliable and valid (Teo & Lee, 2010; Sadaf et al., 2012).

Two items used in Teo and Lee (2010) for measuring subjective norm (SN) and perceived behavioral control (PBC) and adapted for the present study had a coefficient of .91 and .83 respectively. These items were as follows: from Teo and Lee's study "People who are important to me will support me to use computers," "I find computers easy to use." The researcher's edited version of these items for the study are as follows: "Most people who are important to me professionally think I should use EBCT teaching strategies for critical thinking development in nursing students," "If I wanted to, I could easily use EBCT teaching strategies in my classroom/clinical rotation this school year for critical thinking development in nursing students."

Sadaf et al. (2012) reported Cronbach's alpha range of values on their instrument to be "from .83 to .96" (p. 180). Items from Sadaf et al's study were as follows: "I intend to use Web 2.0 technologies as soon as I start teaching," "Using Web 2.0 is a good idea," "My peers will be using Web 2.0 technologies in their classrooms," "My students will think it is important to use Web 2.0 technologies in my classroom," "I have the knowledge and ability to use Web 2.0." The edited version of these items for this study read: "I intend to use EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students this school year," "For me, using EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students is a good idea," "Most of my nurse educator colleagues use EBCT teaching strategies for critical thinking development in nursing students," "Students that I teach would approve my using EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students," "I have the knowledge and ability

to use EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students.”

In an effort to increase construct validity, guidelines for conducting TPB studies and constructing a TPB questionnaire by Ajzen (2005) were followed. Items adapted from the guidelines were: “Whether or not I attend the meetings of this class on a regular basis is completely up to me,” “For me to attend the meetings of this class on a regular basis is extremely valuable,” “I will make an effort to attend the meetings of this class on a regular basis”. Edited versions of these items are as follows: “It will be entirely up to me whether or not I use EBCT teaching strategies in my classroom/clinical rotation this year for critical thinking development in nursing students,” “My using EBCT teaching strategies for critical thinking development in nursing students this year is valuable,” “I will make an effort to use EBCT teaching strategies in my teaching repertoire for critical thinking development in nursing students this school year. In order to improve internal consistency, the items addressing the direct measures were designed with the use of EBCT teaching strategies relating to the sample in this study.

Data Collection Procedures

To ensure that proper protocol was followed in conducting the research study, approval was obtained from the Institutional Review Board (IRB) at Andrews University to conduct research on human subjects. Once approval was gained, contact was made with the Institutional Review Boards of the colleges and universities that offer 4-year nursing degree programs within the designated region of the Southeast United States that formed the sample. This contact was made to inform about the study and to gain

permission to conduct the research at these institutions. Institutional consent letters were obtained from the IRB offices of the institutions who agreed to allow the nursing faculty to be a part of this study.

The researcher then contacted the dean/chair/director of the nursing departments from the consenting colleges and universities via email using contact information obtained from the individual websites for each institution. The initial contact with the nursing administrators provided background information about the purpose and significance of the study seeking support for its conduction with nursing faculty. This method was chosen to reduce the occurrence of sending unsolicited email and the incidence of a low response rate if recruiting was done without the knowledge of the chair/dean/director. Furthermore, Fricker (2008) states, “It is important to note that harvesting email addresses and distributing unsolicited e-mail related to surveys could be a violation of professional ethical standards and/or illegal” (p. 204).

The researcher adhered to established guidelines for conducting educational research (Creswell, 2014; McMillan & Schumacher, 2010). In addition, the five C’s of research ethics principles by Rudestam and Newton (2007) were used as a guide to ensure that all ethical concerns were adequately addressed. Information was provided on confidentiality, coercion, consent, care, and communication regarding the kind of information solicited, risks and benefits of the study, and the informed consent process that must be agreed to before access is given to the survey, confidentiality, voluntary participation in the study, and the avoidance of coercion. To ensure anonymity, no personal or institutional identifying information was collected. The researcher provided contact information for questions about the research and informed that the results will be

reported in the researcher's dissertation document and in peer-reviewed journals in the future.

Following the nursing department director's consent, an invitation letter with the embedded survey link was supplied to each dean/chair/director. All nursing faculty who taught students in the classroom and clinical settings from within the pool of universities that granted approval were selected and invited to participate in the study. Some directors of the nursing departments chose to forward the email containing the invitation letter and survey link to their faculty, while others gave permission for the researcher to use contact information on the website to invite individual nursing faculty to participate in the study per the universities' protocol. A definition of EBCT teaching strategies was provided with examples of these instructional methods. The participants were informed of the benefits including information from the study regarding the factors that influence intention to use EBCT teaching strategies in an effort to inform about the instructional activities that may be related to critical thinking development. Respondents were also informed that there are no known risks or psychological or emotional harm associated with participation in this study and that taking part in the study was a non-reactive activity.

Upon completion of the survey, participants submitted their responses online through the survey platform. A letter of thanks was sent to each nurse educator at the approving institutions where the faculty were invited to participate in the study. The data were then retrieved. An encrypted security measurement was embedded in the online survey and storage and destruction of the data will be managed by the researcher. The data collected were stored in files on the researcher's computer and backed up on flash

drives and other storage devices for analysis. The researcher and methodologist were the only individuals who have access to the raw data. The data gathered will be kept for one year from the date of collection, and deleted from the designated computer and flash drives. Results of the current study will be disseminated to the nursing faculty through the following means: (a) a research summary document will be provided to participating institutions, (b) research briefs will be submitted to peer-reviewed journals with the researcher's contact information, (c) the researcher will host/attend seminars and/or present posters on research findings, (d) present research summary report at local state nurses' association.

Data Analysis

Once the data were collected, the data were exported from Survey Monkey to Excel on a dedicated computer. The researcher then recoded the exported data from text to numerical data to facilitate further exportation from Excel to SPSS for analysis. All statistical analyses were performed using the professional version of SEM with AMOS Version 7.0 (Arbuckle, 2006), and Statistical Software package from IBM/SPSS Version 22 (IBM Corp., 2013) for testing the null hypotheses. Missing data were addressed by SPSS. Any values with missing data were omitted and the remaining data sets were analyzed.

Demographic characteristics of the study sample were analyzed using descriptive statistical methods. From this information, a nurse educator profile was generated. Participants responded to items inquiring about ethnicity, years of teaching nursing, educational level, and training in teaching critical thinking. Additional demographic

information such as nursing specialty, gender, and age were not sought in this study because the purpose was to specifically examine nurse educators' intention.

Data analysis was conducted from the scaled instrument items using the scored responses for each item that gathered information about attitude, subjective norm, perceived behavioral control, nurse educators' intention to use, and actual use of EBCT teaching strategies for critical thinking. According to Garson (2012), SEM's goodness-of-fit tests "determine if the pattern of variances and covariance in the data is consistent with a structural (path) model specified by the researcher" (p. 17, L. N. 701 of 4668). SEM also allows simultaneous analysis of many independent and dependent variables (Buhi et al., 2007; Schreiber, Stage, King, Nora, & Barlow, 2006). The two-step modeling approach to SEM was employed. Evaluation of the measurement model using confirmatory factor analysis was conducted in the first step to verify proper alignment of the items and variables being measured. Buhi et al. (2007) state that the purpose of this first step is to test the relationship between constructs in the model. In the second step, the structural model was estimated and examined to determine the relationship between the endogenous and exogenous variables.

This two-step analysis examined the hypothesized relationships in the model and indicated if there was a good fit of relationship and consistency between the hypothesized model of latent variables and indicators and the observed data. Correlation between the intention to use EBCT teaching strategies for critical thinking and psycho-social behavioral attributes (attitude, subjective norm, and perceived behavioral control) and educator characteristics (ethnicity, years of teaching nursing, educational level, and

training in critical thinking) was determined. The mean and standard deviation were also reported. Using latent variables, the structural model was fitted through SEM.

Chi-square and several approximate fit indexes, Comparative fit index, Tucker-Lewis index, Root mean square error of approximation (*CFI*, *TLI*, *RMSEA*) were used to assess the model fit, and exploratory approach was used to develop an adjusted model as needed. An indicator of a good fit based on chi-square criteria is a value close to zero and a *p*-value >0.05. This result reflects little or no difference between the expected covariance matrices and the observed data (Holtzman & Vezzu, 2011).

Multiple indices were used for the current study in order to assess acceptable model fit relating to direction and significance of the pathways in the analysis. The cut-off criteria for acceptable fit of the model for the above mentioned fit indexes are as follows: $CFI \geq .90$, $TLI \geq .90$; $RMSEA < .06$ to $.08$ with confidence interval.

Summary

In this chapter, the researcher presented a description of the research design, selection of the sample from the population, instrumentation, data collection, and data analysis. The sampling procedure was explained and hypotheses to be tested were identified. A thorough outline of the operational definitions for each variable was included. The statistical technique for data analysis that was undertaken for this study was also described.

CHAPTER IV

RESULTS

Introduction

The aim of the study was to conduct analyses that are geared towards answering the broad research question, “Is the hypothesized model showing direct effect of (a) latent factors of attitude, subjective norm, and perceived behavioral control on intention and (b) intention on actual use supported by the observable data?” Structural equation modeling (SEM) was the statistical analysis technique used to test theoretical linkages and the direction of significant relationships among constructs in a hypothesized model.

Specifically, the study sought to investigate the direct effect on nurse educators’ intention to use EBCT teaching strategies from the standpoint of attitude towards using, subjective norm, and perceived behavioral control influences. In addition, the direct effect of intention to use EBCT teaching strategies on actual use of these techniques was examined in the model using AMOS Graphics version 7.0 (Arbuckle, 2006).

Confirmatory factor analysis (CFA) was used to test the reliability of the observed variables guided by the underlying Theory of Planned Behavior. Factor loadings were estimated for all observable data in the analysis. This process was followed by exploratory factor analysis using modification indices that sought to explore further relationships among the variables based on the theoretical framework. The chi-square

test, as well as several approximate fit indices, were used to assess the model's goodness of fit as an acceptable model or a reasonable estimate for the observed data.

Demographic data in addition to responses to survey scales were collected and descriptive statistics computed. The presentation of the results commences with a descriptive analysis of the participants, followed by statistics describing the observed variables. The results continue with a report on the research questions and related hypothesis testing, as well as a description of the measurement and structural models.

Description of Participants

The researcher utilized a stratified sampling procedure to obtain participants who taught in 4-year baccalaureate nursing programs in the southeast region of the United States. The total number of participants who responded to the survey out of 755 email invitations sent consisted of 244 nurse educators resulting in a 32% response rate. From this sample a number of respondents did not complete the entire questionnaire. These respondents were eliminated prior to analysis. After the data were cleaned only 209 participants' data were found complete for appropriate analysis. This sample was adequate based on the original need for a range of 200-250 to facilitate robust SEM analysis for testing and fitting the model.

Demographic representation of the remaining 209 participants are presented in Table 1 to indicate ethnicity, years of teaching nursing, educational attainment level, and training in teaching critical thinking. Each ethnicity was represented in the following pool of participants: Asian/Asian American/Pacific Islander, 0.5% ($n = 1$); Black/African

American, 4.8% ($n = 10$); Hispanic Latino, 1.9% ($n = 4$); American Indian, 0.5% ($n = 1$); other 1% ($n = 2$), but were predominantly White/Caucasian, 91.4% ($n = 191$).

In relation to years of teaching nursing, the majority of participants reported teaching more than 15 years, 34% ($n = 71$), followed by 6-10 years, 26.3% ($n = 55$); 3-5 years, 19.1% ($n = 40$); 11-15 years, 12.4% ($n = 26$) and 1 to 2 years, 8.1% ($n = 17$). The education level attained by the participants shows a narrow margin between those who were prepared at the master's level and those at the doctoral level (Master's, 48.4% ($n = 102$), Doctorate 51.2 % ($n = 107$). Eighty-eight of the respondents noted that they had not received any training in teaching critical thinking (42.1%), while 57.9% ($n = 121$) had received training.

Descriptive Statistics of the Variables

The descriptive statistics of the eight variables in this study are shown in Table 2. The mean; standard deviation; minimum and maximum scores; and skewness for the variables attitude, subjective norm, perceived behavioral control, intention, and actual use are reported. In addition, descriptive data for the educator characteristics gathered through ethnicity, years of teaching nursing, educational attainment level and training in teaching critical thinking are presented. For the variable attitude, the participants had an overall score ($M = 3.91$, $SD = 0.49$); for subjective norm ($M = 4.04$, $SD = 0.41$); for perceived behavioral control ($M = 3.46$, $SD = 0.39$); for intention ($M = 4.49$, $SD = 0.56$; and for actual use ($M = 3.49$, $SD = 0.63$). These mean scores were computed on a Likert scale of 1 to 5 with 1 representing *Strongly Disagree* and 5 representing *Strongly Agree*. The perceived behavioral control mean score received the lowest score of the five scales.

The results for educator characteristics showed ethnicity ($M = 1.22$, $SD = 0.80$), years of teaching nursing ($M = 3.45$, $SD = 1.34$), educational attainment level ($M = 1.51$, $SD = 0.50$), and training in teaching critical thinking ($M = 0.58$, $SD = 0.50$). Among these demographic characteristics, training in teaching critical thinking had the lowest mean score.

Table 1

Participant Demographic Characteristics (n = 209)

Variable	<i>n</i>	%
Ethnicity		
White/Caucasian	191	91.4
Asian/Pacific Islander	1	0.5
Black/African American	10	4.8
Hispanic/Latino	4	1.9
American Indian/Native American	1	0.5
Other	2	1.0
Years of teaching nursing		
1 to 2	17	8.1
3 to 5	40	19.1
6 to 10	55	26.3
11 to 15	26	12.4
> 15	71	34.0
Educational attainment level		
Master's	102	48.8
Doctorate	107	51.2
Training in teaching critical thinking		
No	88	42.1
Yes	121	57.9

Table 2

Descriptive Statistics for Attitude, Subjective Norm, Perceived Behavioral Control, Intention, Actual Use, Ethnicity, Years of Teaching, Educational Attainment Level, and Training in Teaching Critical Thinking

Variable	<i>M</i>	<i>SD</i>	Min	Max	Skewness	
					Stats	<i>SE</i>
Attitude	3.91	0.49	2.75	5.00	-0.21	0.17
Subjective Norm	4.04	0.41	2.45	5.00	-0.22	0.17
Perceived Behavioral Control	3.46	0.39	2.38	4.50	0.04	0.17
Intention	4.49	0.56	2.00	5.00	-0.98	0.17
Actual Use	3.49	0.63	1.63	5.00	-0.32	0.17
Ethnicity	1.22	0.80	1.00	6.00	3.93	0.17
Years of teaching nursing	3.45	1.34	1.00	5.00	-0.22	0.17
Educational attainment level	1.51	0.50	1.00	2.00	-0.05	0.17
Training in teaching critical thinking	0.58	0.50	0.00	1.00	-0.32	0.34

Descriptive Statistics of Survey Items

This section describes the statistics for each observed variable associated with the latent variables attitude, subjective norm, perceived behavioral control, intention, and actual use. The items for each variable required respondents to indicate their level of agreement with using EBCT teaching strategies to foster critical thinking in nursing students during instruction in both classroom and clinical rotation settings. A detailed analysis of the responses for measurement items on attitude towards using EBCT teaching

strategies for critical thinking in nursing students is shown on Table 3.

For item Attid 02, 64.1% ($n = 134$) strongly agreed that using EBCT teaching strategies is valuable; for Attid 04, 53.1% ($n = 111$) strongly disagreed that using EBCT teaching strategies is impossible. Item Attid 13 showed that 60.8% ($n = 127$) strongly agreed that using EBCT teaching strategies is a good idea, while for Attid 17, 59.3% ($n = 124$) agreed using EBCT teaching strategies is challenging. In the first stage of the SEM analysis, items with non-significant loadings or with more than one correlation between error terms were deleted. As a result, item Attid17 was deleted from the final model analysis.

Table 3

Frequency and Percentages of Responses for Measurement Items on Attitude ($n = 209$)

	Strongly disagree n (%)	Disagree n (%)	Neither agree nor disagree n (%)	Agree n (%)	Strongly agree n (%)
Attid02	1 (0.5%)	—	7 (3.3%)	67 (32.1%)	134 (64.1%)
Attid04	111 (53.1%)	60(28.7%)	9 (4.3%)	16 (7.7%)	13 (6.2%)
Attid13	—	—	3 (1.4%)	79 (37.8%)	127 (60.8%)
Attid17	3 (1.4%)	28(13.4%)	29 (13.9%)	124 (59.3%)	25 (12.0%)

Note. Dashes mean there were no responses given for the items on these scales

Table 4 shows an analysis of the responses for measurement items on subjective norm. In examining the responses for measurement items on subjective norm related to intention to use EBCT teaching strategies for critical thinking in nursing students, Sub03 showed 48.3% ($n = 101$) strongly agreed that most of their

professional colleagues who are important to them think that EBCT teaching strategies should be used, while 17.2% ($n = 36$) neither agreed nor disagreed with this statement. For item Sub05 51.7% ($n = 108$) agreed that students would approve instructors using EBCT teaching strategies, while 13.4% ($n = 28$) neither agreed nor disagreed. For item Sub09 that inquired about the State Board of Nursing approving instructors' use of EBCT teaching strategies, one respondent strongly disagreed; 45.9% ($n = 96$) strongly agreed; and 38.8% ($n = 81$) agreed. Fifty-one percent of the respondents ($n = 108$) in item Sub11 agreed that they do what most people who are important to them professionally think they should do, while 5.7% ($n = 12$) disagreed, and 0.5% ($n = 1$) strongly disagreed. Item Sub15 showed that none of the respondents disagreed on the statement that the accreditation agency would approve using EBCT teaching strategies and 48.3% ($n = 101$) strongly agreed.

The majority of the respondents 52.6% ($n = 110$) in item Sub19 agreed that using EBCT is an expectation of them; however, 5.3% ($n = 11$) disagreed, and 1.0% ($n = 2$) strongly disagreed. Item Sub20 showed that 47.8% ($n = 100$) agreed and 46.9% ($n = 98$) strongly agreed that administrators including the president, dean, director, or chair would approve using EBCT teaching strategies. For item Sub21, 60.3% ($n = 126$) agreed that they generally do what their administrators expect them to do. Only 8.1% ($n = 17$) respondents strongly agreed in item Sub23 that most of their nursing educator colleagues used EBCT teaching strategies for critical thinking, while 45% ($n = 94$) agreed, 35.9% ($n = 75$) neither agreed nor disagreed, 9.6% ($n = 20$) disagreed and 1.4% ($n = 3$) strongly agreed. This item showed the highest number of responses in the disagree and strongly

disagree scales among the items measuring subjective norm.

Item Sub24 showed that 65.1% ($n = 136$) agreed that most people who are important to them would approve of their using EBCT teaching strategies. For item Sub26, 44% ($n = 92$) neither agreed nor disagreed that parents would approve instructors using EBCT teaching strategies, while 38.8% ($n = 81$) agreed with this statement. In the first stage of the SEM analysis, items with non-significant loadings or with multiple correlations between error terms were deleted. As a result, items Sub03, Sub11 and Sub23 were deleted from the adjusted model presentation.

Table 4

Frequency and Percentages of Responses for Measurement Items on Subjective Norm ($n = 209$)

	Strongly disagree n (%)	Disagree n (%)	Neither agree nor disagree n (%)	Agree n (%)	Strongly agree n (%)
Sub03	1 (0.5%)	1 (0.5%)	36 (17.2%)	70 (33.5%)	101 (48.3%)
Sub05	1 (0.5%)	5 (2.4%)	28 (13.4%)	108 (51.7%)	67 (32.1%)
Sub09	1 (0.5%)	—	31 (14.8%)	81 (38.8%)	96 (45.9%)
Sub11	1 (0.5%)	12 (5.7%)	62 (29.7%)	108 (51.7%)	26 (12.4%)
Sub15	—	—	20 (9.6%)	88 (42.1%)	101 (48.3%)
Sub19	2 (1.0%)	11 (5.3%)	42 (20.1%)	110 (52.6%)	44 (21.1%)
Sub20	—	1 (0.5%)	10 (4.8%)	100 (47.8%)	98 (46.9%)
Sub21	—	2 (1.0%)	39 (18.7%)	126 (60.3%)	42 (20.1%)
Sub23	3 (1.4%)	20 (9.6%)	75 (35.9%)	94 (45.0%)	17 (8.1%)
Sub24	—	1 (0.5%)	9 (4.3%)	136 (65.1%)	63 (30.1%)
Sub26	—	2 (1.0%)	92 (44.0%)	81 (38.8%)	34 (16.3%)

Note. Dashes mean there were no responses given for the items on these scales

Responses for measurement items on perceived behavioral control influencing intention to use EBCT teaching strategies for critical thinking in nursing students are summarized in Table 5. For item Per06, 49.8% ($n = 104$) strongly agreed that they were confident in using EBCT teaching strategies for critical thinking development in nursing students, while 6.7% ($n = 14$) reported that they neither agreed nor disagreed. Item Per07 showed that 43.5% ($n = 91$) agreed that whether or not they used EBCT teaching strategies was entirely up to them, while 8.1% ($n = 17$) disagreed with that statement and 12.9% ($n = 27$) neither agreed nor disagreed, and 2.4% ($n = 5$) strongly disagreed. Forty-seven percent of the respondents ($n = 99$) in item Per08 agreed that using EBCT teaching strategies would demand more time, while 14.4% ($n = 30$) neither agreed nor disagreed, and 11.0% ($n = 23$) disagreed. For item Per12, 39.7% ($n = 83$) agreed that if they were required to prepare materials for activities that placed unanticipated demands on their time, using EBCT teaching strategies would be more difficult, while 20.1% ($n = 42$) neither agreed nor disagreed, 26.3% ($n = 55$) disagreed, and 5.3% ($n = 11$) strongly disagreed.

Fifty-four percent of the respondents ($n = 113$) in item Per16 agreed that they had the knowledge and ability to use EBCT teaching strategies, while 5.3% ($n = 11$) disagreed. For item Per18, 52.2% ($n = 109$) agreed that if they wanted to, they could easily use EBCT teaching strategies, while 20.1% ($n = 42$) neither agreed nor disagreed, and 7.2% ($n = 15$) disagreed. Responses for item Per22 showed a narrow margin between those who agreed and those who disagreed revealing that 33.0% ($n = 69$) agreed while 30.6% ($n = 64$) disagreed that it would make it more difficult to use EBCT teaching

strategies if they were required to commit more time to faculty development opportunities related to critical thinking and instructional strategies. Twenty-four percent ($n = 50$) neither agreed nor disagreed with this statement. For item Per25, the majority of respondents 33.0% ($n = 69$) agreed that if they are required to teach a certain amount of content material within a given class period, it would become more difficult for them to cover content while implementing EBCT teaching strategies; 8.1% ($n = 17$) strongly agreed, 24.9% ($n = 52$) neither agreed nor disagreed, 27.8% ($n = 58$) disagreed and 6.2% ($n = 13$) strongly disagreed. In the first stage of the SEM analysis, items with non-significant loadings or with multiple correlations between error terms were deleted. As a result, items Per07, Per16, and Per18 were deleted from the adjusted model presentation.

Table 5

Frequency and Percentages of Responses for Measurement Items on Perceived Behavioral Control ($n = 209$)

	Strongly disagree n (%)	Disagree n (%)	Neither agree nor disagree n (%)	Agree n (%)	Strongly agree n (%)
Per 06	–	–	14 (6.7%)	91 (43.5%)	104 (49.8%)
Per07	5 (2.4%)	17 (8.1%)	27 (12.9%)	91 (43.5%)	69 (33.0%)
Per08	5 (2.4%)	23 (11.0%)	30 (14.4%)	99 (47.4%)	52 (24.9%)
Per12	11 (5.3%)	55 (26.3%)	42 (20.1%)	83 (39.7%)	18 (8.6%)
Per16	–	11 (5.3%)	12 (5.7%)	113 (54.1%)	73 (34.9%)
Per18	1 (.5%)	15 (7.2%)	42 (20.1%)	109 (52.2%)	42 (20.1%)
Per22	13 (6.2%)	64 (30.6%)	50 (23.9%)	69 (33.0%)	13 (6.2%)
Per25	13 (6.2%)	58 (27.8%)	52 (24.9%)	69 (33.0%)	17 (8.1%)

Note. Dashes mean there were no responses given for the items on these scales

Table 6 shows a detailed analysis of the responses to measurement items on intention to use. When examining items on intention to use EBCT teaching strategies for critical thinking in nursing students, 59.8% ($n = 125$) strongly agreed that they will make an effort to use EBCT teaching strategies, 36.8% ($n = 77$) agreed, 2.9% ($n = 6$) neither agreed nor disagreed, and 0.5% ($n = 1$) strongly disagreed. For item Int10, 55.5% ($n = 116$) strongly agreed that they intended to use EBCT teaching strategies, 37.3% ($n = 78$) agreed, 6.7% ($n = 14$) neither agreed nor disagreed, and 0.5% ($n = 1$) strongly disagreed. Forty-nine percent of the respondents ($n = 102$) in item Int14 strongly agreed that they would aim to use EBCT teaching strategies, 46.4% ($n = 97$) agreed, 4.8% ($n = 10$) neither agreed nor disagreed. In the first stage of the SEM analysis, no items were deleted for this variable.

Table 6

Frequency and Percentages of Responses for Measurement Items on Intention
($n = 209$)

	Strongly disagree n (%)	Disagree n (%)	Neither agree nor disagree n (%)	Agree n (%)	Strongly agree n (%)
Int01	1 (0.5%)	—	6 (2.9%)	77 (36.8%)	125 (59.8%)
Int10	1 (0.5%)	—	14 (6.7%)	78 (37.3%)	116 (55.5%)
Inten14	—	—	10 (4.8%)	97 (46.4%)	102 (48.8%)

Note. Dashes mean there were no responses given for the items on these scales

In identifying actual use of EBCT teaching strategies based on specific techniques derived from the literature, respondents were asked to indicate frequency of

use on the following 5-point scale: (1) *Never*, (2) *Rarely*, (3) *Sometimes*, (4) *Often*, and (5) *Always*. The responses are shown in Table 7. Overall the EBCT teaching strategies that included concept mapping, reflection activities, simulation, role modeling, coaching, case studies, journaling, and debating were used by the respondents to some degree. Selected results for each strategy reveals that for item Act27, 30.1% ($n = 63$) of the respondents used concept mapping sometimes, 13.4% ($n = 28$) rarely used concept mapping and 19.6% ($n = 41$) never used this EBCT teaching strategy. For reflection activities in item Act28, 40.7% ($n = 85$) used reflection activities often, 31.6% ($n = 66$) always used these activities, 20.6% ($n = 43$) used them sometimes and 4.8% ($n = 10$) rarely used reflection. Simulation use in item Act29 showed that 21.1% ($n = 44$) always used simulation, 36.8% ($n = 77$) used this strategy often, 24.9% ($n = 52$) used it sometimes and 9.6% ($n = 20$) never used simulation.

Thirty-seven percent of the respondents ($n = 78$) in item Act30 used role modeling often, 18.7% ($n = 39$) used this strategy sometimes, 33.0% ($n = 69$) always used and 4.8% ($n = 10$) never used role modeling. For coaching in item Act31, 39.7% ($n = 73$) used it always, 14.4% ($n = 30$) used it sometimes and 5.3% ($n = 11$) never used coaching. For item Act32, forty-six percent of the respondents ($n = 97$) reported using case studies often, 32.5% ($n = 68$) always used case studies, 18.7% ($n = 39$) of the respondents used this strategy sometimes, and 1.9% ($n = 4$) rarely used case studies. In item Act33, twenty-five percent ($n = 53$) used journaling often, 25.4% ($n = 53$) used this method sometimes and an equal number used it sometimes and often 25.4% ($n = 53$); 15.8% ($n = 33$) rarely used journaling and 17.7% ($n = 37$) never used journaling. Debating that was measured in item Act34 showed that only 4.8% ($n = 10$)

always used debating, 33.0% ($n = 69$) used debating sometimes, 26.8% ($n = 56$) rarely used debating and 21.1% ($n = 44$) never used debating.

Based on the responses from the participants, the EBCT teaching strategy that is used the most frequently is coaching (34.9%) followed by role modeling (33.3%), then case studies (32.5%), and reflection activities (31.6%). Debating is used the least frequently (4.8%)

Table 7

Frequency and Percentages of Responses for Measurement Items on Actual Use ($n = 209$)

	Never <i>n</i> (%)	Rarely <i>n</i> (%)	Sometimes <i>n</i> (%)	Often <i>n</i> (%)	Always <i>n</i> (%)
Act 27					
Concept Mapping	41 (19.6%)	28 (13.4%)	63 (30.1%)	57 (27.3%)	20 (9.6%)
Act 28					
Reflection Activities	5 (2.4%)	10 (4.8%)	43 (20.6%)	85 (40.7%)	66 (31.6%)
Act 29 Simulation	20 (9.6%)	16 (7.7%)	52 (24.9%)	77 (36.8%)	44 (21.1%)
Act 30 Role Modeling	10 (4.8%)	13 (6.2%)	39 (18.7%)	78 (37.3%)	69 (33.0%)
Act 31 Coaching	11 (5.3%)	12 (5.7%)	30 (14.4%)	83 (39.7%)	73 (34.9%)
Act 32 Case Studies	1 (.5%)	4 (1.9%)	39 (18.7%)	97 (46.4%)	68 (32.5%)
Act 33 Journaling	37 (17.7%)	33 (15.8%)	53 (25.4%)	53 (25.4%)	33 (15.8%)
Act 34 Debating	44 (21.1%)	56 (26.8%)	69 (33.0%)	30 (14.4%)	10 (4.8%)

The correlations between the observables measured from the data showing the coefficient matrix and mean and standard deviation are presented in Table 8.

Zero order correlation measures direct effect and reflect the relationships to

determine the magnitude and direction among variables. Overall, the results show that there are moderate to high correlation among groups of items. Medium to low correlations were noted between attitude and subjective norm ($p < .01$). The relationship between the observables for intention and attitude and intention and subjective norm showed significance at $p < .01$. Minimal correlation was noted between perceived behavioral control and attitude at $p < .01$ and $p < .05$ levels.

The highest mean was for items Attid02 ($M = 4.59$, $SD = .61$) and Attid13 ($M = 4.59$, $SD = .52$) that related to the value of using EBCT teaching strategies and agreeing that using EBCT teaching strategies is a good idea. The lowest mean was for item Attid04 ($M = 1.85$, $SD = 1.19$) that implied that using EBCT teaching strategies was impossible. Overall, the higher mean values for the observables for attitude were associated with a positive attitude towards intention to use EBCT teaching strategies while lower scores indicated a less positive attitude. Out of 3 items, only 1 showed a low score ($M = 1.85$, $SD = 1.19$) indicating that participants had a more positive attitude towards using EBCT teaching strategies than a negative one.

The higher mean values for the observables for subjective norm were associated with normative social pressure to use EBCT teaching strategies as well as approval from others related to intention to use these strategies. Out of eight items, six showed high values indicating that the participants' EBCT teaching strategies intention to use was influenced by significant others.

The higher mean values for the observables for intention ($M = 4.47$; $M = 4.44$; $M = 4.56$) were associated with a willingness to exert effort to use EBCT teaching

strategies. All three items showed high scores indicating that the participants had high intention to use EBCT teaching strategies. The higher mean values for the observables for perceived behavioral control ($M = 3.81$; $M = 3.20$) were associated with high perception of ability to perform or have control over using EBCT teaching strategies, as well as perceived hindrances or enhancers. All four items showed medium scores ($M = 3.81$; $M = 3.20$; $M = 3.02$; $M = 3.09$) indicating that the participants had some perception of their ability and control to perform EBCT teaching strategies. For actual use of EBCT teaching strategies, the mean scores from highest to lowest are case studies ($M = 4.09$, $SD = .79$); reflection papers ($M = 3.94$, $SD = .96$); coaching ($M = 3.93$, $SD = 1.09$); role modeling ($M = 3.88$, $SD = 1.09$); journaling ($M = 3.06$, $SD = 1.33$); concept mapping ($M = 2.94$, $SD = 1.26$); and debating ($M = 2.55$, $SD = 1.12$).

Hypothesis Testing

This section presents the results according to the hypotheses. The main hypothesis (H1) stated that the covariance matrix represented by the hypothesized model is equal to the covariance matrix of the empirical covariance matrix was tested. Rooted in Ajzen's Theory of Planned Behavior, the hypothesized measurement model shows how latent variables represented by circles relate to each other and with observables (indicators) represented by rectangles. The lines on the model indicate a hypothesized direct relationship between the variables. In Figure 2, the indicators in the rectangles on the model are predicted by the latent variable. The hypothesized model suggest that attitude (as measured by three questions); subjective norm (as measured by eight questions); and perceived behavioral control (as measured by four questions) can predict

intention (as measured by three questions). Further prediction is depicted in the model suggesting that intention (as measured by three questions) predict actual use (as measured by seven questions).

The theoretical relationship under study proposes that the constructs attitude, subjective norm, perceived behavioral control, and intention determine the degree of agreement with the statements such as “I will make an effort to use EBCT teaching strategies in my teaching repertoire for critical thinking development in nursing students this year.” The researcher hypothesized that there is: (a) a direct impact of attitude to use EBCT teaching strategies on intention to use; (b) a direct impact of subjective norm related to using EBCT teaching strategies on intention to use; and (c) a direct impact of perceived behavioral control influencing use of EBCT teaching strategies and intention to use. Furthermore, there is a direct impact of intention to use on actual use. Intention may also be directly affected by demographics or background factors that are depicted on the initial hypothesized model as educator characteristics of ethnicity, years of teaching, educational attainment level, and training in teaching critical thinking. The measurement model in Figure 2 is based on sub-hypotheses (SH2 – SH5). This model shows the items used for the initial data analysis.

The first stage of data analysis was to test the construct validity and reliability of the scales. Confirmatory factor analysis (CFA), a process that is used to determine the existence of a relationship between observed variables and latent constructs, was used.

Through the CFA process, for each item, the factor loadings for the measurement model that show the strength of the relationship and how much contribution the variable

made was computed. Most factor loadings were significant at the $p < .05$ level. One item from the latent factor attitude and one from actual use had non-significant loadings. A rule of thumb for determining how items are retained is to accept variables with loadings $>.40$. There is also a .5/.2 rule where an item is retained if its initial loading is $>.5$ and if its highest factor after initial loading is smaller than .2.

The results show that most of the items retained had adequate to high loadings. The final number of observable items retained for the latent factors are attitude – 3, subjective norm – 8, perceived behavioral control – 4, intention – 3, and actual use – 7 making a total of 25 observables. Items with non-significant loadings or with multiple correlations between error items were deleted. The number of items deleted for each construct was as follows: attitude – 1, subjective norm – 3, perceived behavioral control – 3, and actual use – 1. No items were deleted from the variable intention to use. The indicator or items for the variable educator characteristic including ethnicity, years of teaching, educational level, and training in critical thinking did not have significant loadings and were deleted. Table 9 presents the factor loadings for all observable items in the measurement model.

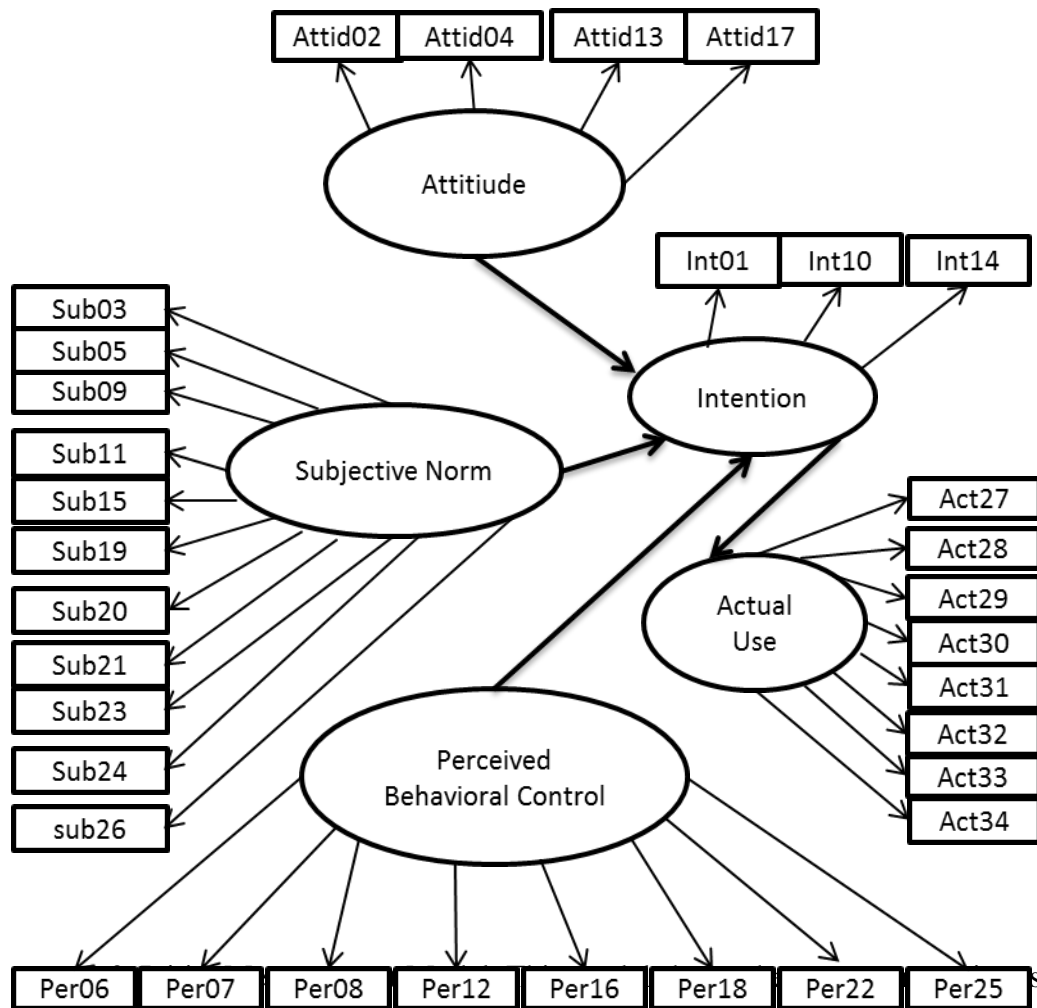


Figure 2. Initial Measurement Model. This model shows the measurement items (observables) associated with each variable. The educator characteristics variables were not included in this model due to non-significant loadings of the items.

Table 8

Zero Correlation Coefficient Matrix, Mean and Standard Deviation for Observables

Items	Attid02	Attid04	Attid13	Sub05	Sub09	Sub15	Sub19	Sub20	Sub21	Sub24	Sub26	Int01
Attid02												
Attid04	-.16*											
Attid13	.54**	-.28**										
Sub05	.42**	-.02	.30**									
Sub09	.40**	-.09	.42**	.45**								
Sub15	.35**	-.12	.53**	.33**	.57**							
Sub19	.18*	.01	.24**	.34**	.27**	.23**						
Sub20	.30**	-.09	.43**	.37**	.51**	.48**	.39**					
Sub21	.04	-.03	.15*	.24**	.20**	.20**	.22**	.26**				
Sub24	.22**	-.15*	.34**	.27**	.38**	.36**	.24**	.48**	.31**			
Sub26	.09	-.02	.26**	.31**	.30**	.20**	.23**	.30**	.19**	.30**		
Int01	.79**	-.18**	.49**	.38**	.32**	.27**	.18*	.27**	.02	.18*	.08	
Int10	.72**	-.15*	.57**	.34**	.35**	.32**	.23**	.29**	.02	.22**	.14*	.82**
Int14	.55**	-.20**	.73**	.26**	.30**	.43**	.24**	.30**	.09	.31**	.23**	.61**
Per08	.06	.20**	-.01	-.06	.09	.03	-.13	.06	-.02	-.01	.09	.08
Per12	-.16*	.11**	-.11	-.22**	-.01	-.09	-.27**	-.09	-.03	-.03	-.01	-.16*
Per22	-.10	.25**	-.11	-.07	.01	-.08	-.09	-.08	-.03	-.05	-.02	-.13
Per25	-.10	.31**	-.10	-.11	-.03	-.15*	-.11	-.03	-.03	-.01	.01	-.14*
Act27	.09	.05	.08	-.01	.03	-.01	.01	.13	-.02	.01	.02	.14
Act28	.15*	-.05	.19**	.06	.09	.17*	.07	.10	.11	.13	.06	.25**
Act30	.06	-.06	.06	.09	.15*	.20**	.12	.07	-.01	-.01	.03	.06
Act31	.14*	-.14*	.12	.06	.12	.22**	.04	.12	.06	.07	-.00	.13
Act32	.10	-.01	.20**	.10	.10	.18*	.05	.02	-.10	.09	-.03	.11
Act33	.10	-.11	.01	.00	.04	.08	.11	-.05	.06	.01	-.05	.14*
Act34	.06	.03	.11	.08	.10	.15*	.07	.01	-.06	.02	-.01	.06
Mean	4.59	1.85	4.59	4.12	4.30	4.39	3.88	4.41	4.00	4.25	3.70	4.56
SD	0.61	1.19	0.52	0.76	0.75	0.66	0.83	0.61	0.65	0.55	0.75	0.60

Table 8 – *Continued*

Items	Int10	Int14	Per08	Per12	Per22	Per25	Act27	Act28	Act30	Act31	Act32	Act33	Act34
Int10													
Int14	.72**												
Per08	.09	.03											
Per12	-.15*	-.21**	.41**										
Per22	-.05	-.09	.29**	.42**									
Per25	-.12	-.15*	.39**	.51**	.50**								
Act27	.16*	.14*	-.09	-.14*	-.11	.05							
Act28	.25**	.25**	.02	-.12	-.06	-.10	.18*						
Act30	.15*	.071	-.11	-.11	-.04	-.14*	.20**	.36**					
Act31	.16*	.11	-.07	-.17*	-.11	-.19**	.12	.37**	.55**				
Act32	.23**	.21**	.04	-.12	-.06	-.08	.11	.25**	.17*	.15*			
Act33	.17*	.12	-.06	-.09	-.05	-.010	.09	.45**	.29**	.25**	.22**		
Act34	.10	.11	-.07	-.05	-.03	-.03	.09	.36**	.37**	.34**	.31**	.34**	
Mean	4.47	4.44	3.81	3.20	3.02	3.09	2.94	3.94	3.88	3.93	4.09	3.06	2.55
SD	0.67	0.59	1.01	1.90	1.07	1.09	1.26	0.96	1.09	1.09	0.79	1.33	1.12

Note. * Indicates significance level of $p < .05$ (2-tailed). ** Indicates significance level of $p < .01$ (2-tailed).

Attid – Attitude, Sub = Subjective norm, Int = Intention, Per = Perceived behavioral control, Act = Actual Use

Table 9

*Factor Loadings**Exploratory Factor Analysis of the Measurement Model*

Variable	Items	Factor Loading Estimates
Attitude	Attid02	0.81
	Attid04	-0.17
	Attid13	0.68
Subjective Norm	Sub05	0.59
	Sub09	0.7
	Sub15	0.62
	Sub19	0.47
	Sub20	0.73
	Sub21	0.33
	Sub24	0.57
	Sub26	0.43
Perceived Behavioral Control	Per08	0.52
	Per12	0.7
	Per22	0.63
	Per25	0.77
Intention	Int01	0.8
	Int10	1
	Int14	0.72
Actual Use	Act27	0.24
	Act28	0.63
	Act30	0.65
	Act31	0.65
	Act32	0.4
	Act33	0.52
	Act34	0.57

Several fit indices were applied including the goodness-of-fit index (GFI), the comparative fit index (*CFI*), Tucker-Lewis Index (*TLI*) and the Root Mean Square Error of Approximation (*RMSEA*). The GFI and the CFI that indicate a better fit have values ranging from 0 to 1 with a value greater than .90 deemed a good fit. For the TLI the range is similar to GFI and CFI but can exceed 1. With the RMSEA a value of 0 denotes exact fit and a range of .05 to .08 has been identified as a fair fit. Prior to analysis, the data were checked for missing values and outliers. All missing cases were deleted. The results show that the initial theoretical model did not meet the criteria of .90 to suggest adequate fit of the model to observed data ($X^2 = 1810.14$, $GFI = .66$, $CFI = .58$, $TLI = .50$; $RMSEA = .09$ with a 90% confidence interval of .09 at the low level and .10 at the high level). The items related to educator characteristics lacked reliability, and therefore, these indicators were eliminated (see Table 10).

Since the initial model did not fit the data due to elimination of latent factors associated with the variable educator characteristics, the analysis process took the form of an exploratory analysis stage used to modify the initial model that showed to be a poor fit for the observed data. The main purpose of this step was to (a) determine the number of underlying factors influencing variance and correlation in and among the items; (b) identify that items loaded on specific factors; and (c) identify and remove items as necessary that do not load on factors. Criteria used for this exploratory stage were modification indices provided by AMOS and the theory that guided the study.

The structural model was modified, adjusted and improved using two steps, (a) eliminating unreliable indicators, and (b) adding three correlational parameters to the model between “Attitude towards using EBCT,” “Subjective norm,” and Perceived behavioral control” that were significant and were not included in the initial model.

The fit of the adjusted model indicated the following: $X^2(264, n - 209) = 398$, $p < .05$; goodness-of-fit index (GFI) = 0.88; comparative fit index (CFI) = 0.92; Tucker-Lewis Index (TLI) = 0.91; root mean square error of approximation $RMSEA$ (90% confidence interval) = .05(.04 - .06). Based on the criteria established for reasonable fitting of the model, the adjusted model resulted in improved fit (see Table 10).

Table 10

Chi-square and Goodness-of-Fit Indices for the Initial and Adjusted Models

Indices	Initial Model	Adjusted Model
X^2	1810.14	398
DF	661	264
P	0.00	0.00
CMIN/DF	2.74	1.51
GFI	0.66	0.88
AGFI	0.62	0.85
PGFI	0.59	0.71
CFI	0.58	0.92
NFI	0.47	0.81
TLI	0.05	0.91
PRATIO	0.94	0.88
PCFI	0.54	0.81
RMSEA	0.09	0.05
LO 90	0.09	0.04

Table 10 - *Continued*

	Indices	Initial Model	Adjusted Model
	HI 90	0.10	0.06
	AIC	1976	519.67
	BIC	2237.52	723.55
	CAIC	2317.52	784.55
	HOELTER		
	.05 Default Model	83	159
	.05 Independence	47	35
Model	.01 Default Model	87	168
	.01 Independence	49	37
Model			

The adjusted model is presented in Figure 3 showing numerical estimates for each latent factor in the model that indicates the strength of the relationship. The main difference between the hypothesized model and the adjusted model was the exclusion of items in the measurement model and modifications in some relationships described in the structural model.

Table 11 presents a summary of regression coefficients as measures of the relationship between the variables of attitude, subjective norm, perceived behavioral control, intention, and actual use. A significant relationship was shown between attitude and intention ($\beta = 0.95, p < .05$). This variable had the highest magnitude of direct effect on the independent variable intention to use EBCT teaching strategies and suggested that nurse educators' attitude toward using EBCT teaching strategies had a significant impact

on intention to use these instructional methods. Subjective norm ($\beta = -0.12, p = 0.03$) had a weak negative effect on intention to use EBCT teaching strategies. This suggests that for subjective norm, the perceptions of other significant individuals did not have a strong direct effect on nurse educator's intention to use EBCT teaching strategies. On the other hand, perceived behavioral control ($\beta = -0.03, p = 0.54$) had a non-significant effect on intention to use EBCT teaching strategies. For perceived behavioral control, this suggests that perceptions of control and perceived enhancers or barriers did not have a significant direct effect on nurse educator intentions to use EBCT teaching strategies. In other words, the influence of subjective norm was not found to be a strong predictor of nurse educator intention to use EBCT teaching strategies, and perceived behavioral control was not found to be a predictor of intention to use EBCT teaching strategies.

The relationship between intention to use EBCT teaching strategies and actual use showed a medium positive effect on actual use ($\beta = 0.30$). The results showed a significant positive correlation supported by the theory between attitude and subjective norm ($r = .61$), while correlations between subjective norm, and perceived behavioral control, and attitude and perceived behavioral control showed negative non-meaningful relationships between the factors ($r = -.13$ and $r = -.11$) respectively.

Table 11

Regression Coefficients for Model Variables

	<i>B</i>	β	<i>C.R.</i>	<i>p</i>
Intention <-- Attitude	0.9	0.95		
Intention <-- Subjective Norm	-0.13	-0.12	-2.2	0.03
Intention <-- Perceived Behavioral Control	-0.02	-0.03	-0.62	0.54
Actual Use <-- Intention	0.2	0.3	2.5	0.01

There were five null sub-hypotheses. The first sub-hypothesis (SH1) examined the relationship between intention to use EBCT teaching strategies for critical thinking and educator characteristics (ethnicity, years of teaching nursing, educational attainment level, and training in teaching critical thinking). The null hypothesis specifically stated that there is no direct effect of educator characteristics on intention to use EBCT teaching strategies for critical thinking. The analysis showed no significant loadings with ethnicity, years of teaching nursing, educational attainment level, and training in teaching critical thinking related to intention to use EBCT teaching strategies. No direct effect of educator characteristics on intention to use EBCT teaching strategies was found; therefore, the null hypothesis was retained.

The second sub-hypothesis (SH2) examined the relationship between intention to use EBCT teaching strategies for critical thinking and attitude towards intention to use EBCT teaching strategies. The null hypothesis specifically stated that there is no direct effect of attitude on intention to use EBCT teaching strategies for critical thinking. The

analysis showed that attitude had a strong significant effect on intention to use EBCT teaching strategies ($\beta = .95, p < .05$). Therefore, the null hypothesis was rejected.

The third sub-hypothesis (SH3) examined the relationship between intention to use EBCT teaching strategies for critical thinking and subjective norm related to intention to use EBCT teaching strategies. The null hypothesis specifically stated that there is no direct effect of subjective norm on intention to use EBCT teaching strategies for critical thinking. The analysis showed subjective norm had a significant effect on intention to use EBCT teaching strategies ($\beta = -.12, p < .05, p = .03$). Therefore, the null hypothesis was rejected.

The fourth sub-hypothesis (SH4) examined the relationship between intention to use EBCT teaching strategies for critical thinking and perceived behavioral control influencing intention to use EBCT teaching strategies. The null hypothesis specifically stated that there is no direct effect of perceived behavioral control on intention to use EBCT teaching strategies for critical thinking. The analysis showed that perceived behavioral control did not have a significant effect on intention to use EBCT teaching strategies ($p = .54$). Therefore, the null hypothesis was retained.

The fifth sub-hypothesis (SH5) examined the relationship between intention to use EBCT teaching strategies for critical thinking and actual use of EBCT teaching strategies. The null hypothesis specifically stated that there is no direct effect of intention to use EBCT teaching strategies for critical thinking and actual use. The analysis showed

that intention to use EBCT teaching strategies showed a significant small effect on actual use ($\beta = 0.30, p < .05, p = 0.01$). Therefore, the null hypothesis was rejected.

The overall results showed that attitude had the strongest effect on intention to use EBCT teaching strategies, followed by subjective norm. Perceived behavioral control did not have a significant effect on intention to use EBCT teaching strategies. The beta coefficients of the significant factors show that attitude explained 90% of the variation in intention.

Summary of Results

This chapter summarizes the analysis of the statistical techniques employed to examine the relationships between and among the variables. The broad research question asked: Is the hypothesized model showing direct effect of (a) latent factors attitude, subjective norm, and perceived behavioral control on intention, and (b) intention on actual use supported by observable data? One main hypothesis was tested to answer the research question. This hypothesis sought to determine if the covariance matrix represented by the hypothesized model is equal to the covariance matrix of the empirical covariance matrix. Structural equation modeling (SEM) analysis indicated that the initial model did not adequately fit the data. However, through exploratory analysis, an adjusted model provided the best goodness-of-fit indices that were a reasonable model fit for the observed data.

The relationships between the latent factors indicated that there was a statistically significant direct positive effect of attitudes on intention to use EBCT teaching strategies,

while subjective norm showed a weak negative effect on intention to use EBCT teaching strategies. The relationship between intention to use EBCT teaching strategies and actual use indicated that intention had a medium positive effect on actual use. The inter-relatedness among variables was not intentionally analyzed in this study. However, results in the adjusted model showed correlations were found between two of the latent factors such that a significant positive correlation was noted between attitude and subjective norm. Demographic data revealed that the majority of participants were White/Caucasian, had more than fifteen years' experience teaching nursing, were prepared at the doctoral level of education, and had received some training in teaching critical thinking.

Five null sub-hypotheses were tested in accordance with the theory. No significant loadings were noted between the educator characteristics/demographics and intention to use EBCT teaching strategies. For the latent variables, attitude showed a strong significant effect on intention to use EBCT teaching strategies; subjective norm showed a significant weak negative effect on intention to use EBCT teaching strategies; and perceived behavioral control showed no significant effect on intention to use EBCT teaching strategies. Intention to use EBCT teaching strategies showed a significant effect on actual use.

This study examined the relationship between the determinants of intention, also known as latent factors, namely attitude, subjective norm, and perceived behavioral control on intention to use EBCT teaching strategies for critical thinking development in

nursing students through model testing. In addition, the relationship between intention to use EBCT teaching strategies and actual use was examined. Statistical analyses showed similar, yet different results with findings from previous research and the theoretical framework that guided the study.

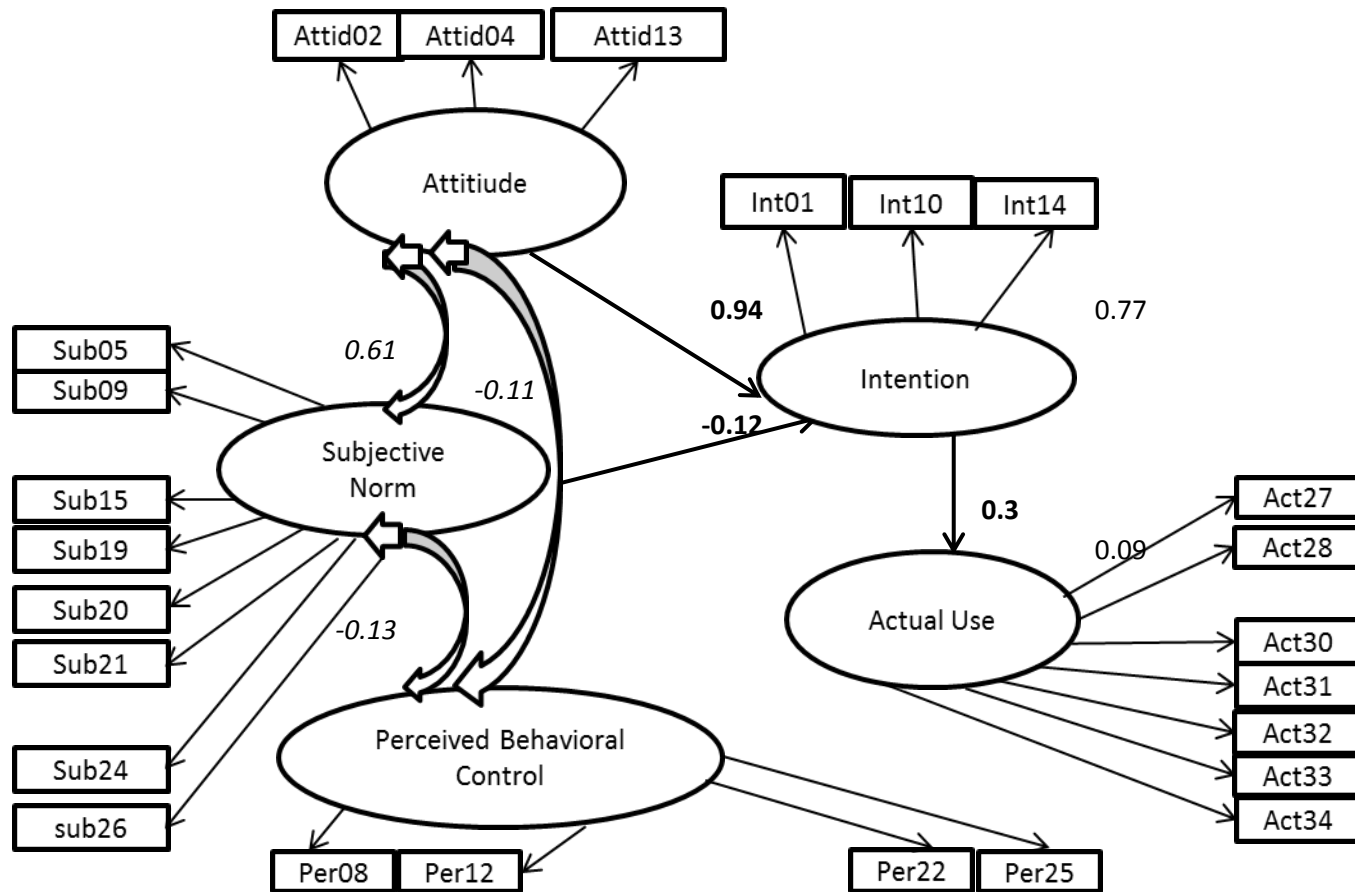


Figure 3. Adjusted Measurement Model. This model shows (a) the measurement items that remained after items with non-significant loadings were deleted.

CHAPTER V

DISCUSSION

Introduction and Background

The Foundation for Critical Thinking (2013) summarizes critical thinking as a cognitive activity where the thinker analyzes, assesses, and reconstructs his or her thinking in an effort to improve thinking. In both nursing education and practice, development of critical thinking and clinical reasoning skills to prepare nursing students to be competent health care providers have become an urgent matter in response to the rapid changes in health care delivery (Benner et al., 2010; Benner, 2015; IOM, 2011; Tanner, 2010). At the center of this preparation are nurse educators who face the task of choosing and using appropriate evidence-based teaching strategies to foster critical thinking in students. Research has shown that teachers play an important role in assisting students to achieve their academic goals (Corso et al., 2013; Firmender et al., 2014; Nathan, 2015). Also noted is the fact that a teacher's attitude, values, and beliefs impact what methods he or she employs for student instruction (Alsharif & Yongyue, 2014).

In the field of nursing, writers and organizations including the National Council of State Boards of Nursing have agreed that evidence-based nursing practice must be reflected in evidence-based nursing education programs (Benner et al., 2010; Balakas et al., 2013; Geum Oh et al., 2010; Institute of Medicine, 2011; Linton & Prasun, 2013). Therefore, with a strong argument to transform nursing education from covering large

amounts of content to teaching students to think critically through essential areas of content and practice (Banfield et al., 2012; Benner et al., 2010; Brown, Kirkpatrick, Mangum & Avery, 2008; Freed & McLaughlin, 2013; Institute of Medicine, 2010; Murphy, 2004), there is a dire need to examine nurse educators' teaching behaviors.

One area of concern is the continued use of traditional teaching methods that may not effectively address the learning needs of the present generation of nursing students or their ability to function effectively in clinical nursing practice (Glasgow et al., 2010; Kaddoura, 2011; Winters & Echeverri, 2012). The critical need to integrate appropriate evidence-based teaching methods in the nursing curriculum cannot be overemphasized. However, equally important is the need to investigate teacher-related factors that may determine the degree of educator intention to use and the actual use of appropriate teaching methods to foster critical thinking skill development in nursing students.

Many organizations including the National League for Nursing (NLN) and the Institute of Medicine (2011) have promoted the need for critical thinking in nursing. Others have recognized the link between the acquisition of critical thinking skills and the ability to use them in nursing practice (Banfield et al., 2012; Benner et al., 2010; Benner, 2015; Glasgow et al., 2010; Josephsen, 2014). Although the emphasis on critical thinking in nursing practice and education is evident, and the role of the nurse educator recognized, there has been little or no advancement towards investigating the elements that may contribute to an instructor's use of critical thinking strategies from a psychosocial behavioral perspective.

Research focusing on the important role of critical thinking in patient care delivery continues to receive priority. However, little if any research has been conducted to examine the factors that may influence the integration of critical thinking (CT) teaching strategies in the classroom and clinical rotation instructional settings for nursing students. Using the Theory of Planned Behavior (TPB) developed by Ajzen (1991) as the theoretical framework, this study has explored the opportunity to identify the factors that influence nurse educators' intention to use critical thinking teaching strategies in this study referred to as evidence-based critical thinking (EBCT) teaching strategies related to attitude, subjective norm, and perceived behavioral control. As the theory focuses not only on intention but also extends into actual behavior, this study further sought to examine the effect of intention to use critical thinking teaching strategies on actual use.

An extensive search by the researcher for published literature on teacher intention to use instructional methods only revealed a small number of studies that have measured this construct mostly in the areas of technology over the past five to six years (Ajjan & Hartshorne, 2009; Lee et al., 2010; Teo & Lee, 2010; Teo, 2011; Valtonen et al., 2015). One other study conducted by Bagnardi (2006) although dated, provided information about nursing faculty intention to use service learning as an instructional technique. No other studies were found specific to nursing faculty's intention to use any other instructional method.

Meta-analyses of the TPB report that the theory has been used in a variety of studies for more than twenty years to explain human behavior such as weight control,

condom use, physical activity, adolescent behavior, health habits behavior, to name a few (McEachan et al., 2011). The theory posits that behavioral intention is the most influential predictor of behavior and is impacted by attitude towards the behavior, subjective norm, and perceived behavioral control (Ajzen, 1991). Intention is defined as the degree to that an individual is willing to try or exert effort to perform the behavior. Subjective norm refers to the level of social pressure or influence to perform or not perform the behavior. Perceived behavioral control is viewed as the amount of confidence a person has about his/her ability to perform the behavior and the amount of control an individual perceives he/she has over performing the behavior. This construct also takes into consideration barriers, enhancers, and perception about how easy or how difficult performing the behavior might be.

For a theoretical framework, this study examined two relationships between (a) nurse educators' intention to use EBCT teaching strategies to develop critical thinking in nursing students and attitude toward using, subjective norm relation to using, perceived behavioral control influencing use; and (b) nurse educators' intention to use EBCT teaching strategies and actual use. This theoretical framework tested the statement that if nurse educators have a positive attitude towards using evidence-based teaching strategies for critical thinking development in nursing students, along with a normative level of social pressure to use these strategies, and strong perceived behavioral control over their ability to use them, then intention to use critical thinking teaching strategies will be high. If nurse educators' intention to use critical thinking teaching strategies for critical

development is high, then actual use of these methods will be high also. The hypothesized model used to demonstrate the relationships among the constructs from the Theory of Planned Behavior provides a new way to examine nurse educator intention relating to critical thinking instruction.

Statement of the Problem

Despite the fact that critical thinking has been declared an essential skill in nursing education and practice, reports from employers on 36 competencies show that new registered nurse graduates are entering the workforce without the required critical thinking and clinical judgment skills necessary for competent patient care (Berkow et al., 2008). A recent report also showed that newly hired nurses on a pediatric unit who were tested on critical thinking ability had deficits in nursing content in specialty areas and in the nursing process. The nurses who scored lowest experienced difficulty with planning patient care and responding to patients with declining health status (Ryan & Tatum, 2012). One of the contributing problems is the continued use of rote learning methods in educational programs preparing nurses for practice (Kalmakis et al., 2010; Wangenstein, et al., 2010). Impediments to integrating critical thinking activities in teaching have been noted to include insufficient time, lack of knowledge to teach critical thinking, and lack of confidence in ability to teach critical thinking (Kowalczyk et al., 2012; Patterson & Klein, 2012). As a result, the need to examine factors within the nursing education system that may impact noted deficiencies in critical thinking ability is pivotal to enacting any instructional changes that may be necessary.

In the field of nursing education, research to determine the factors that contribute to educator behavior in the use of critical teaching strategies that are evidence-based is minimal, if any. Therefore a clearer understanding of these factors as they relate to intention to use critical thinking teaching strategies and actual use may help to provide direction for administrators, curriculum designers, and researchers to explore avenues to promote pedagogical excellence.

Purpose of the Study

The purpose of the study was to examine the relationships among the factors presented in the theory-based hypothesized model that influence nurse educators' intention to use critical thinking teaching strategies that are evidence-based from a psycho-social behavioral perspective. These attributes based on the Theory of Planned Behavior include attitude towards using EBCT teaching strategies, subjective norm relating to use, and perceived behavioral control influencing use. Other factors noted to impact intention to use that were examined include educator characteristics of ethnicity, years of teaching nursing, educational level, and training in teaching critical thinking. Following the theoretical framework and further extending the theory's application to the field of nursing education, this study also sought to examine the effect of intention to use EBCT teaching strategies on actual use. Nurse educators who taught in 4-year undergraduate nursing degree programs in the southeast region of the United States comprised the participants for this study.

Research Questions

The central research question for this study was: Is the hypothesized model showing direct effect between (a) latent factors of attitude, subjective norm, and perceived behavioral control on intention to use EBCT teaching strategies, and (b) intention to use EBCT teaching strategies on actual use supported by the observable data.

The study further aimed to answer five sub-questions:

Question 1: Is there a significant direct effect of educator characteristics (ethnicity, years of teaching nursing, educational attainment level, and training in teaching critical thinking) on intention to use EBCT teaching strategies?

Question 2: Is there a significant direct effect of attitude towards using EBCT teaching strategies for critical thinking development on intention to use EBCT teaching strategies?

Question 3: Is there a significant direct effect of subjective norm related to using EBCT teaching strategies for critical thinking development on intention to use EBCT teaching strategies?

Question 4: Is there a significant direct effect of perceived behavioral control influencing use of EBCT teaching strategies for critical thinking development on intention to use EBCT teaching strategies?

Question 5: Is there a significant direct effect of intention to use EBCT teaching strategies for critical thinking development on actual use of EBCT teaching strategies?

Research Design

This study utilized a quantitative, non-experimental correlation survey and cross-sectional design. Quantitative research provides the opportunity to test theories by examining the relationships among variables (Creswell, 2014). In addition, correlation studies allow testing of the relationships between two variables. The advantage of studying different groups at the same time in a cross-sectional study is an asset to any research study (McMillan & Schumacher, 2010).

A survey method with a questionnaire adapted and reported from the published literature guided by the TPB was used for data collection. The structural equation modeling (SEM) statistical technique with AMOS was used to analyze the data. Structural equation modeling is a combination of statistical techniques to include factor analysis and multiple regression and is considered to be more robust, allowing models with more than one dependent variable to be tested, and also analysis of many indicators per latent variable (Garson, 2012). The focus of SEM according to Schneider, Stage, King, Nora & Barlow (2006), “is on estimating relationships among hypothesized latent constructs” (p. 325). Since this study examined the relationships among factors in a hypothesized model, SEM seemed appropriate because this method allows the researcher to test hypotheses about the theoretical linkage and direction of the relationships.

This study examined possible relationships between the dependent variable intention to use EBCT teaching strategies and the independent variables – attitude towards use, subjective norm relating to use, and perceived behavioral control

influencing use. An additional examination of the effect of intention to use EBCT teaching strategies on actual use was analyzed.

Data were gathered through an online 34-item survey/questionnaire that required respondents to identify his /her ethnicity, years of teaching nursing, educational level, and training in teaching critical thinking in the first section. The second part of the questionnaire required respondents to indicate level of agreement on a 5-point Likert scale from (1) *Strongly Disagree* to (5) *Strongly Agree* on items related to the constructs attitude, subjective norm, perceived behavioral control, and intention. The items relating to actual use required respondents to indicate frequency measured on a 5-point Likert scale from (1) *Never* to (5) *Always* of selected EBCT teaching strategies identified in the literature.

SPSS (IBM Corp., 2013) was used to conduct descriptive analysis and delete missing values, while SEM using AMOS version 7.0 (Arbuckle, 2006) was used for analysis of the model fit to the observable data and testing of the main null hypothesis and null sub-hypotheses. The hypothesized relationships between the latent factors were examined by SEM.

Two hundred and forty-four nurse educators participated in this study. After deleting respondents with missing values, the final number used in the analysis was 209. The descriptive analysis of the data was presented in demographic form and item analysis was shown on a covariance matrix (see Table 8).

Summary of the Findings

The hypothesized model in this research study helped to explain the overall relationships among the latent factors of attitude, subjective norm, perceived behavioral control, intention, and actual use. In SEM, the fit between the model and observed data is determined through the use of several goodness-of-fit indices. Analysis of the data through Structural Equation Modeling (SEM) indicated that the initial hypothesized model did not adequately fit the data. Therefore, exploratory analysis that involves modifying the model based on the theoretical framework was conducted and an adjusted model was created. The results of the adjusted model indicated an acceptable fit matching recommended benchmarks ($X^2 = 398$; $X^2/df = 1.51$; $GFI = 0.88$; $CFI = 0.92$; $TLI = 0.91$; $RMSEA = 0.05$). Results from the squared multiple correlation showed that the combined effect of the three predictor variables i.e., attitude, subjective norm, and perceived behavioral control explained 77% of the variance in intention to use. Nine percent of the variance in actual use was explained by intention to use.

The null hypotheses for the five sub-hypotheses in this study were tested for further analysis and elaboration of the relationships shown in the hypothesized model. Three of the sub-hypotheses were statistically significant and two were not. These null sub-hypotheses were tested at $p < .05$ level. The first sub-hypothesis found that there was no statistically significant direct effect of educator characteristics (ethnicity, years of teaching nursing, educational attainment level, and training in teaching critical thinking) on intention to use EBCT teaching strategies for critical thinking development in nursing

students. Therefore, null hypothesis SH1 was retained and these variables did not contribute to the adjusted model, but were included in the results as descriptive statistics. The results indicated that the majority of the responding nursing faculty were White/Caucasian (91.4%) with 34% having more than 15 years' experience in teaching nursing. The majority were prepared at the doctoral level (51.2%) and 57.9% reported receiving training in teaching critical thinking. Interestingly, although the majority of nurse educators had a doctoral degree and received training in teaching critical thinking, a large proportion (48.4%) were prepared at the master's level. Also, 42.1% of the responding nursing faculty had not received training in teaching critical thinking.

The following results are based on the adjusted model that provided a reasonable fit for the observed data. For the second sub-hypothesis, that examined the direct effect of attitude towards using EBCT teaching strategies on intention to use, the results of model testing depicting the direction and magnitude of the relationships revealed that attitude towards use of EBCT teaching strategies had a strong significant direct effect on intention to use ($\beta = .95, p < .05$) and accounted for 90% of the variance in intention to use. As such, null hypothesis SH2 was rejected.

The third sub-hypothesis tested found that there was a statistically significant direct weak negative effect of subjective norm related to using EBCT teaching strategies on intention to use ($\beta = -.12, p = .03$). These results partially supported null sub-hypothesis 3. Therefore, null hypothesis SH3 was rejected. The fourth sub-hypothesis found that the negative effect of perceived behavioral control influencing use of EBCT

teaching strategies on intention to use was not significant ($\beta = -.03, p = .54$). Therefore, null hypothesis SH4 was retained. The examination of the relationship between intention to use EBCT teaching strategies and actual use tested in sub-hypothesis five (SH5) showed that intention contributed significantly to actual use ($\beta = 0.30, p = 0.01$) indicating a direct effect relationship. Therefore, null hypothesis SH5 was rejected.

The results of the adjusted model further indicated that there was a strong correlation between attitude towards using EBCT teaching strategies and subjective norm ($r = .61$). Correlations between attitude and perceived behavioral control ($r = -.11$) and subjective norm, and perceived behavioral control ($r = -.13$) revealed a weak or almost non-existent negative relationship between these constructs. From the results, attitude towards using EBCT teaching strategies had a significant positive direct impact on intention to use, while subjective norm had a significant direct weak negative effect. However, perceived behavioral control did not have a significant direct effect on intention to use EBCT teaching strategies.

The zero correlation coefficients showed that there were a number of significant relationships. Correlations across all items ranged from a low of $-.14$ to a high of $.82$. The strongest significant relationship in the analysis of items emerged between attitude and intention ($.79$). Attitude had moderate to strong ($-.15$ to $.79$) correlations with intention; subjective norm had ($-.14$ to $-.43$) correlation with intention and perceived behavioral control had ($-.14$ to $-.16$) correlation with intention. The correlations of the items for intention and actual use show a range of ($.14$ to $.25$). The mean scores for the

variables from highest to lowest are intention ($M = 4.49$, $SD = 0.56$); subjective norm ($M = 4.04$, $SD = 0.41$); attitude ($M = 3.91$, $SD = 0.49$); actual use ($M = 3.49$, $SD = 0.63$); and perceived behavioral control ($M = 3.46$, $SD = 0.39$).

Responses to items measuring the variable attitude indicated that the majority of nurse educators strongly agreed that using EBCT teaching strategies was valuable (64.1%); and a good idea (60.8%). On the variable subjective norm, 48.3% strongly agreed that their colleagues expected them to use EBCT teaching strategies. Approval from significant others and organizations to use EBCT teaching strategies showed that 51.7% agreed students would approve, 45.9% strongly agreed their State Board of Nursing would approve; and 48.3% strongly agreed the accreditation agency would approve. Fifty-three percent agreed that using EBCT teaching strategies was an expectation. Surprisingly, only 8.1% strongly agreed that most of their colleagues used EBCT teaching strategies in their instruction.

Results on responses for perceived behavioral control indicated that approximately half (49.8%) strongly agreed that they felt confident in using EBCT teaching strategies, 54% agreed that they had the knowledge and ability to use EBCT teaching strategies. Forty-four percent agreed and 33% strongly agreed that the choice of whether or not they used EBCT teaching strategies was up to them. The results showed that nurse educators had a high level of control and ability relating to using EBCT teaching strategies. Forty-seven percent agreed that using EBCT teaching strategies would demand more planning time, and (40%) agreed that preparing materials for

learning activities would not make it more difficult to use EBCT teaching strategies.

Results from the items measuring the variable ‘intention to use’ showed favorable results, with 59.8% strongly agreeing to make an effort to use EBCT teaching strategies as part of their teaching repertoire.

As predicted in the theory and from the literature, the relationship between intention to use and actual use showed a statistically significant direct effect ($p = 0.3$). Responses about frequency of use for selected EBCT teaching strategies revealed that overall, the most frequently used EBCT teaching strategy was coaching (34.9%) and the least frequently used was debating (4.8%). Figure 4 shows the direction of the relationships between the independent and dependent variables.

Discussion of the Findings

The examination of a hypothesized model depicting proposed relationships among constructs based on the Theory of Planned Behavior that affords prediction and understanding of relationships was the basis of this study. Specifically, the model was tested for goodness-of-fit to the observed data gathered through items related to each construct. The discussion of the findings will highlight the evaluation of the adjusted model through the assumptions and predictions of the theory organized around the main hypothesis followed by a detailed presentation of five sub-hypotheses.

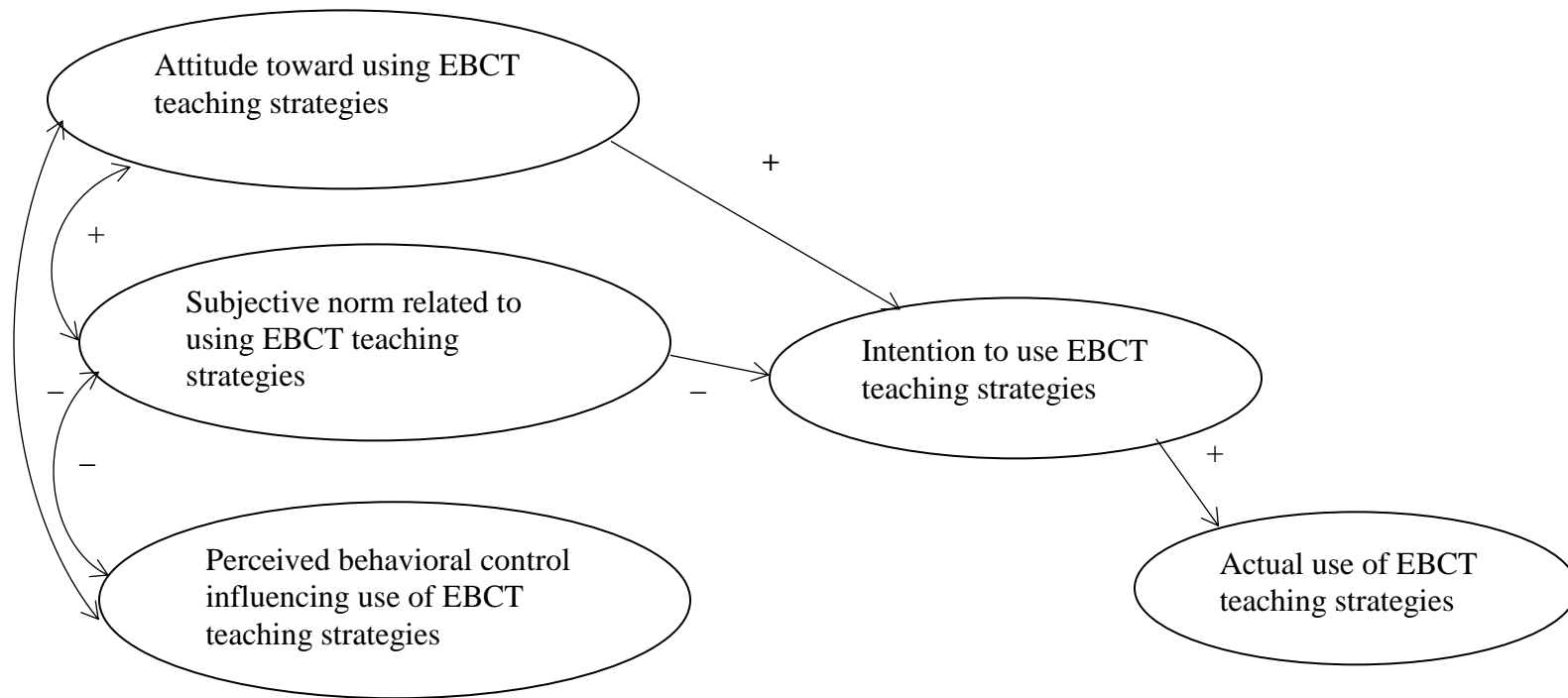


Figure 4. Hypothesized Theoretical Model Results. This figure illustrates (a) the direction of the relationship of attitude, subjective norm on intention based on the data; (b) the direction of the relationship of intention on actual use of EBCT teaching strategies; and (c) the correlations between the independent variables. No relationship was found between perceived behavioral control and intention to use.

H₁: Relationships Between the Hypothesized Model's Covariance Matrix and the Empirical Covariance Matrix.

The hypothesized model based on the Theory of Planned Behavior provided an estimation of the magnitude and significance of proposed relationships of three direct constructs – attitude towards using EBCT teaching strategies for critical thinking development, subjective norm related to use, and perceived behavioral control influencing use with intention to use. In addition, an estimation of the effect between intention to use EBCT teaching strategies and actual use was integrated into the model. The theory also acknowledges the interaction of the three direct constructs with each other that may indirectly influence nurse educators' intention to use EBCT teaching strategies.

The theoretical framework of the study establishes the following relationships: (a) that attitude, subjective norm, and perceived behavioral control are predictors of intention, and (b) intention is the most significant determinant of behavior (Ajzen, 1991). Research conducted in a variety of contexts, behaviors, and settings have supported this theoretical framework including intention to use health literacy strategies, intention to enter treatment after detoxification, teacher intention to use technology, intention to use positive adolescent lifestyle factors, and intention to use online learning systems (Cafiero, 2013; Kelly et al., 2011; Lee et al., 2010; Moshki & Torabi, 2014; Yu & Yu, 2010). The overall conclusion states that the more favorable an individual's attitude (positive assessment of the behavior), subjective norm (positive perception from significant others

about the behavior), and the greater the perceived behavioral control (confidence in ability and enhancers to perform the behavior), the higher will be the intention to perform. The higher the intention to perform, the more likely the behavior will be exhibited.

The results of the current study shown in the adjusted model suggest that one factor (attitude) positively influenced nurse education intention to use EBCT teaching strategies. This study showed that the nurse educators who responded had a positive attitude towards using critical thinking teaching strategies that are evidence-based, and as a result intention to use was high. The effect of attitude on intention to use was significantly different from zero at the .05 level ($p < .05$). This finding supported the theoretical framework that posits attitude as a strong predictor of intention.

In contrast to predictions in the theory the results showed that there was a significant direct weak negative effect of subjective norm on intention to use. The effect of subjective norm on intention to use showed a significantly different value from zero at the .05 level ($p = .03$).

Another result at odds with the theory is the finding that there was no statistically significant direct effect of perceived behavioral control on intention to use EBCT teaching strategies ($p = .54$). The findings in this study were supported by previous research conducted by Teo & Lee (2010) who found “that attitudes toward usage and subjective norm were significant predictors of behavioral intention to use technology while perceived behavioral control was not” (p. 968). Forty percent of the variance in

behavioral intention was explained by the three constructs – attitude, subjective norm, and perceived behavioral control, and a test of their model indicated a reasonable fit.

The last relationship in the adjusted model between intention to use EBCT teaching strategies and actual use was supported in the data and indicated a statistically significant direct effect ($p = 0.01$). Overall, the results of the current study suggested that the adjusted model has a good fit to the observed data and partially supported the main theoretical framework of the relationships among the constructs that directly influenced nurse educators' intention to use EBCT teaching strategies. Only one area of the theoretical framework was not met. Seventy-seven percent of the variance in intention to use was explained by attitude, subjective norm, and perceived behavioral control.

However, in the current study, only one of the factors – attitude had a direct significant positive effect on nurse educators' intention to use EBCT teaching strategies, whereas Lee et al.'s (2010) study showed that all three factors had a statistically significant effect on intention. Other related studies support the full theory in finding statistically significant relationships between the three factors – attitude, subjective norm, and perceived behavioral control and intention. Among these studies is Cafiero (2013) who studied nurse practitioners' intention to use health literacy strategies in clinical nursing practice. Although a number of studies that applied the TPB in different contexts indicated that attitude toward the behavior and perceived behavioral control significantly influenced intention (Ajjan Hartshorne, 2009; McEachan et al., 2011; Kim, Kim, Huh & Knutson, 2010; Teo, 2011), an important point to note in the theory is that the

relationships among attitude, subjective norm, and perceived behavioral control in predicting intention is expected to vary across behaviors, situations, and populations (Ajzen, 1991). Therefore, for only one or two of the constructs in the theory to have a significant impact on intention is not an unusual outcome. This is shown in other research using the TPB model such as Marandu et al.'s (2011) findings that indicated perceived behavioral control to be the only statistically significant predictor of intention ($\beta = 0.495$, $t = 6.220$, $p = 0.000$) in their study investigating science teachers' intention to teach about HIV/AIDS.

Further explanation for each of the results related to the variables in this study (educator characteristics, attitude, subjective norm, perceived behavioral control, intention, and actual use) will be presented in the discussion of each sub-hypothesis.

SH₁: Relationship Between Educator Characteristics and Intention to Use

Pertinent demographic data about the participants including ethnicity, years of teaching nursing, educational attainment level, and training in teaching critical thinking were collected. Relating to the Theory of Planned Behavior, Ajzen and Fishbein (2005) suggested that other factors such as gender, age, ethnicity, exposure to information, and education may indirectly affect intention to perform a behavior. Review of the literature only showed a small number of previous studies that have shown positive direct effects of these background factors on intention (Bagnardi, 2006; Cafiero, 2013; Moshki et al., 2014). For example, Cafiero (2013) found a statistically significant relationship between

post-masters certificate nurse practitioners and those prepared at the doctoral level ($p = .039$) related to their intention to use health literacy strategies.

However, Ajzen and Fishbein (2005) cautioned that although significant direct effects have been found between certain background factors and intention and behavior, the most significant influence is through the determinants of intention. Results of direct effects on intention and behavior may be small. This may be a possible explanation as to why, in the current study, information on demographic characteristics did not fully impact the overall analysis of the model relating to intention to use EBCT teaching strategies due to non-significant loadings. If the theory states that certain background factors such as age, ethnicity, and education may not significantly contribute to intention or behavior, then these findings were logical. Reporting the nurse educator characteristics may help to shed light and explain other results that were derived from the model testing.

The majority of participants were White/Caucasian (91.4%) with more than 15 years' experience teaching nursing (34%). Most were prepared at the doctoral level of education (51.2%) and had received training in teaching critical thinking (52.9%). However, an important finding is that 26.3% of the participants had 6-10 years of teaching experience in nursing, and only 8.1% had 1-2 years teaching experience. Another result, which has implications for this study is that 42.1% of the nurse educators reported not having received training in teaching critical thinking. This result is consistent with previous studies that revealed educators' lack of knowledge of critical

thinking and the ability to efficiently model, integrate, or evaluate critical thinking skills affected the development of critical thinking skills in students (Kowalczyk et al., 2012; Aliakbari & Sadeghdaghighi, 2013).

SH₂: Relationship Between Attitude Towards Using EBCT Teaching Strategies and Intention to Use

Examination of sub-hypothesis two revealed that attitude towards using EBCT teaching strategies had a strong influence on nurse educators' intention to use these instructional methods. This result is an expected finding based on the theory's predictions that attitude exerts significant influence on intention to perform the behavior under examination and strongly rejects the null sub-hypothesis that there is no direct significant effect of attitude on intention to use EBCT teaching strategies for critical thinking development.

The mean scores for the three measured items ($M = 4.59$, $SD = .61$; $M = 1.85$, $SD = 1.19$; $M = 4.59$, $SD = .52$) reflected an overall strong direct effect on intention to use EBCT teaching strategies leading to the conclusion that attitude towards using EBCT teaching strategies was a positive predictor of intention to use these techniques for instruction. This finding suggests that when nurse educators perceived use of critical thinking teaching strategies to be valuable and that using these strategies is a good idea for fostering critical thinking skills in nursing students, their intention to use them in their teaching repertoire would increase significantly. According to the Theory of Planned Behavior (Ajzen, 1991), a positive attitude has a positive direct impact on intention as

shown in the hypothesized model. Previous research conducted on teacher intention to integrate technology during instruction validated that attitude towards behavior was the best predictor of intention to use technology in the classroom (Lee et al., 2010; Pierce & Ball, 2009; Teo & Lee, 2010; Teo, 2011).

SH₃: Relationship Between Subjective Norm Related to Using EBCT Teaching Strategies and Intention to Use

There was an unexpected result that may appear inconsistent with the theory, in that subjective norm emerged as a statistically significant negative contributor of nurse educators' intention to use EBCT teaching strategies ($p = .03$). According to Ajzen (1991) subjective norm is a predictor of intentions and is generally measured by soliciting information about a respondents' rating about the extent to that significant others would approve or disapprove performance of a behavior. Also, this construct is based on perception of others' approval and defined as the level of social pressure an individual feels to perform or not perform the behavior.

The findings reveal that the items related to this construct received high ratings with mean scores ranging from 3.70 to 4.59 on a 5-point scale. These results indicated that the respondents agreed that individuals including students, deans/directors/chairs, and parents as well as professional agencies such as the State Boards of Nursing and accreditation organizations would approve use of EBCT teaching strategies. This endorses the idea in the theory that the opinions of important people may significantly impact whether or not a nurse educator integrates critical thinking teaching strategies in

his or her instruction of nursing students. The field of nursing practice and education by nature of influencing health care delivery must be approved by others in order to maintain and ensure a high level of quality care. Organizations such as the Joint Commission of Accreditation for Health care Organizations (JCAHO) and accreditation bodies (AACN, ACEN, CCNE, and NLN-CNEA) are mandated with monitoring and evaluating health care facilities and nursing programs.

One possible explanation for the statistically significant weak negative effect finding of subjective norm on intention to use is that while nurse educators may perceive that significant others support and approve the use of critical thinking teaching strategies, the more social pressure they feel to use these instructional methods, the less they may tend to use them. In other words, if nurse educators perceive less social pressure by significant others, their intention to use critical thinking teaching strategies may increase. Nurse educators may depend on others' approval to influence their intention to use, but may view using critical thinking teaching strategies as a professional responsibility rather than an act performed due to social pressure. Another explanation for this finding between subjective norm and intention to use may be that the concepts of approval and social pressure measured in the eleven items may not be applicable or important to the respondents in this study. Three items were eliminated due to insignificant loadings during the SEM analysis process, and of the remaining eight, six items inquired about approval from students, state board of nursing, accreditation agency, administrators, and parents, and two items inquired about expectations that covered the social pressure

aspect. The fact that for the “expectation” items there was an equal number of respondents, who remained neutral compared to those who strongly agreed, may mean that they did not identify with the degree of social pressure measured in expectation or that participants interpreted the items differently.

Although a significant relationship was found between subjective norm and intention to use EBCT teaching strategies, the influence of the effect was negative. In the area of teacher intentions, there is a dearth of research studies using TPB, and of the ones found, none of the results fully supported a significant negative direct effect of subjective norm on intention to use instructional techniques. One research study that refutes the results of the current study was done by Teo (2011) who found that subjective norm was significant predictor and had a direct influence on teacher intention to use technology.

On the other hand, in partial support of the findings in this study, Lee et al. (2010) found subjective norm to be the second most significant influence after attitude on teachers’ intention to use computer technology for instruction. In a review of the limited TPB studies with teachers, Teo (2011) reported that subjective norm had an indirect influence on teacher’s intention to use technology, while Kriek and Stols (2010) found subjective norm to have a significant influence on actual use of simulations for classroom teaching. This supports the assumption in the theory that the degree of relationship between attitude, subjective norm, and perceived behavioral control and prediction of intention to perform a given behavior varies across behaviors, contexts, and people. Generally, in a large number of studies reported in historical and recent meta-analyses

using the TPB model in different contexts, subjective norm yielded the least influence on intention to perform a given behavior, while in other studies, this variable has shown a medium to strong influence on intention (McEachan et al., 2011).

SH₄: Relationship between perceived behavioral control and intention to use

In the hypothesized model, this researcher proposed that perceived behavioral control will have a significant direct effect on intention to use EBCT teaching strategies for critical thinking development. This proposed relationship coincides with the theoretical framework that perceived behavioral control over the performance of a behavior coupled with one's perception of ability can account for significant influence and variance in intention to perform the behavior (Ajzen, 1991). As such, items addressing self-efficacy as well as level of control over performance of the behavior are said to measure this variable.

Four items remained in the model after four were eliminated due to non-significant loadings. The mean scores for these items were moderate ranging from 3.02 to 3.81 having minimal correlations with other items on the zero correlation coefficient matrix. Contrary to the theory's framework, the results in this study show that perceived behavioral control failed to have a statistically significant effect on intention to use ($p = .54$). This finding did not lend support to previous studies where perceived behavioral control was found to have a significant effect on intention (Casper, 2007, Kelly et al., 2011, Lee et al., 2010, Marandu et al., 2011; McEachan et al., 2011; Nelson et al., 2013). However, in previous studies applying the Theory of Planned Behavior to teacher

intentions, perceived behavioral control did not contribute significantly to pre-service teachers' intention to use technology (Teo & Lee, 2010).

Although the finding for perceived behavioral control on intention to use may seem inconsistent with the expectations of the theoretical framework as well as findings of a number of previous studies (Cafiero, 2013; Kriek & Stols, 2010; Lee et al., 2010; McEachan et al., 2011), there may be a plausible explanation as this may not be inconsistent after all. The theory posits that where no problems exist regarding volitional control over performance of the behavior, perceived behavioral control may not contribute to the prediction of intention or behavior performance (Ajzen, 1991). The possibility exist that nurse educators in this study did not perceive controllability and ability factors as having a significant influence on whether or not they used critical thinking teaching strategies. In their scope of practice, nurse educators can perform autonomously and responses to items showed that they perceived high control over using critical thinking teaching strategies and high perception of ability to use.

The non-significant result in the structural modeling equation analysis may suggest that other variables contributed to the covariance in perceived behavioral control. Therefore, since controllability and ability do not appear to be factors that influence intention to use critical thinking teaching strategies, there may be other variables not in the current study worth investigation. For the nurse educators in this study, although perceived behavioral control did not exhibit a significant influence on intention to use

EBCT teaching strategies, the indirect relationship, through the correlation of perceived behavioral control with attitude, contributed to the overall variance in intention.

Due to the fact that there are limited studies on teacher intention using the Theory of Planned Behavior, highlights from other areas are given to provide an overview for supporting the current results. The non-significant influence of perceived behavioral control has been documented in other TPB studies (Teo & Lee, 2010; Freberg, 2013). Relating to teacher intention, Teo and Lee's (2010) study showed that perceived behavioral control was not a significant predictor of pre-service teachers' intention to use technology. Freberg (2013) indicated perceived behavioral control failed to predict intention to comply with a food safety recall message. While the later study is not related to teacher intention, discussing these results in light of the current research provide support for the versatility of relationships based on the theory's premise of varying results in different behaviors and populations.

SH₅: Relationship Between Intention to Use EBCT Teaching Strategies and Actual Use

The theoretical underpinnings of the relationship between intention and behavior (actual use) are emphasized by Ajzen (1991). The performance of the behavior in the context of this study is actual use of EBCT teaching strategies. This is an important aspect of the theory because as Ajzen (1991) argues, intentions may not always be converted to actions. In other words, nurse educators may have good intentions to use

critical thinking teaching strategies, but for many reasons may not integrate them in their instruction.

Sub-hypothesis 5 was tested to determine the existence of a significant direct effect of intention to use EBCT teaching strategies on actual use. The results indicate that there was a statistically significant direct effect of intention to use on actual use, and that the respondents actually used EBCT teaching strategies with varying degrees of frequency. Of the nurse educators who responded, most used coaching “always” (34.9%), followed by modeling (33%), case studies (32.5%), and reflection activities (31.6%). Debating was used the least (4.8%). Interestingly, results showed that some nurse educators “rarely” or “never” used any of the EBCT teaching strategies in this study (concept mapping, reflection activities, simulation, role modeling, coaching, case studies, journaling, and debating). Nineteen percent never used concept mapping and 13.4% rarely used this method of instruction. Nine percent never used simulation and 7.7% rarely used. Seventeen percent never used journaling and 15.8% rarely used this strategy. Twenty-one percent never used debating and 26.8% rarely used this teaching method.

Possible explanations for this finding supported in the literature showing a historical trend over the past 18 years to recent are (a) lack of knowledge (Choy & Cheah, 2009), (b) low ratings of ability to teach critical thinking (Kowalczyk, 2012), (c) institutional barriers (Patterson & Klein, 2012), and (d) lack of critical thinking knowledge and student attitudes and expectations (Aliakbari & Sadeghdaghighi, 2013).

As nursing faculty are responsible for laying the foundation and shaping the development of critical thinking skills through the kinds of instructional methods they use (Oja, 2011; Wane & Lotz, 2013), the finding that some techniques are not being used to foster habits of inquiry and critical thought suggests the need for a closer look at the factors that influence how nursing is taught to foster critical thinking in nursing students.

This is also important for administrators and program directors as they plan faculty development programs and teacher workshops. The current study did not seek to investigate the reasons behind actual use or non-use of EBCT teaching strategies, but other researchers may choose to explore these factors.

The focus on using evidence-based strategies in nursing education is not new. Much has been written about this topic stressing the need to ensure evidence supports both education and practice (Balakas et al., 2013; Chisari et al., 2006; Finotto et al., 2013; Glasgow et al., 2010; Kantor, 2010; Patterson & Klein, 2009). For example, Patterson & Klein (2009) found that educators' use of empirical research to guide teaching practice was low. The current findings still support this data although six years have passed since Patterson and Klein's study was conducted. On the other hand, Finotto et al., (2013) reported that undergraduate nursing students using a curriculum model for evidence-based practice found the model effective in using evidence-based skills to solve patient problems. Supporting the findings in this study are other studies that reported educators using evidence to reform teaching practice. For example, Kantor (2010) reported success

in using evidence to reform nursing education by shifting to a student-centered model approach to curriculum changes that followed a Know-Be-Do (KBD) model.

Other methods such as concept mapping, case studies, reflection, and journaling have been used in nursing education with successful student outcomes (Atay & Karabacak, 2012; Josephsen, 2013; Maneval et al., 2011; Marchigiano et al., 2011; Phillips & Vinten, 2010). Consistent with a previous empirical finding on teachers' intention and actual use of instructional techniques and activities (Kriek & Stols, 2010), the findings of the current study confirmed existence of a significant influence of intention to use on actual use. In Kriek and Stols' (2010) study, the influence of intention to use simulators in the classroom on actual use was predicted with 70.83% accuracy. Furthermore, the results of the current study provided empirical support for earlier research in meta-analyses using the TPB model that proposed intention to be a significant predictor of behavior performance in different areas of human behavior (McEachan et al., 2011).

Inter-relatedness of the Variables

The adjusted model showed that there were correlations between variables that partially support the assumptions of the theoretical framework. Attitude had a positive strong correlation with subjective norm ($r = .61$), and a negative weak correlation with perceived behavioral control ($r = -.11$). The correlation between perceived behavioral control and subjective norm was very low and negative ($r = -.13$). This finding suggests that the nurse educators' positive attitudes and favorable subjective norm appear to be

most instrumental in contributing to intention to use EBCT teaching strategies. In other words, the respondents indicated a strong positive attitude towards using critical thinking teaching strategies that are evidence-based for critical thinking development in nursing students and were also concerned with the approval of significant people in their use of these strategies. A review of previous studies in a recent meta-analysis reported correlation between attitude, subjective norm, and perceived behavioral control (McEachan et al., 2011).

Conclusions of the Study

Fostering critical thinking skills in nursing students has far reaching effects not only for education, but for delivery of quality patient care. Research studies have reported the lack of efficiency in clinical judgment and critical thinking displayed by new graduate nurses. Albeit there are not many studies that have investigated the elements contributing to this lack of readiness for practice, the few research studies that do exist, for example, (Ryan & Tatum, 2012; Fero et al., 2008; Saintsing et al., 2011) have reported that new graduates do not possess the clinical reasoning skills and have not achieved important competencies for nursing practice in the real world. Addressing this deficit by taking an in-depth look at the educator factors influencing critical thinking development in nursing education formed the basis of this study.

Using a hypothesized model based on the Theory of Planned Behavior, this research study sought to examine the relationship between attitude to use EBCT teaching strategies, subjective norm relating to use, and perceived behavioral control influencing

use and nurse educators' intention to use these strategies. The relationship between intention to use and actual use was also explored. Thus, the model was tested to ascertain goodness of fit with the observed data. The initial hypothesized model did not fit the data and an adjusted model was developed that had measurements suitable for an acceptable fit based on specified fit indices.

In general, the hypothesized pattern of relationships depicted on the theory-based model was congruent with previous research. From the theoretical framework, however, not all of the expected relationships were significant. As predicted, attitude towards using EBCT teaching strategies emerged as the factor having the greatest influence and direct significant positive effect on nurse educators' intention to use these instructional methods. On the basis of this result, the nurse educators in this study had a positive attitude and highly valued the use of critical thinking teaching strategies for critical thinking development in nursing students. This positive attitude in turn, according to the theory, increases intention to use.

The approval of others in the professional world and educational environment was important to the nurse educators in this study. However, subjective norm emerged as the factor with a significant direct weak negative effect on nurse educators' intention to use EBCT teaching strategies. This finding adequately portrayed the value that respondents placed on using critical thinking teaching strategies based on expectations and sanctions from administration, accreditation, parents, and students; but the weak negative relationship may suggest that if social pressure to use critical thinking teaching strategies

is increased, the likelihood of nurse educators' intention to use these techniques may be negatively affected. In the field of nursing education and practice, excellence in delivery is constantly evaluated and nurse educators must expect a level of scrutiny and assessment of student learning and program outcomes. Therefore, nurse educators may perceive this requirement not as a duty to perform due to social pressure, but rather as a part of their professional duties to improve student learning outcomes.

One finding that may not appear to be consistent with the theoretical framework regarding perceived behavioral control is that no significant direct effect was found on nurse educators' intention to use EBCT teaching strategies. A possible interpretation for this result is that there may be other variables present that were more important than faculty development time and preparation of learning activities. These areas were not perceived as having a strong impact on intention to use EBCT strategies. This finding was not surprising since the theory states that (a) relative importance of attitude, subjective norm, and perceived behavioral control may vary with behavior and context, and (b) where there are no problems of ability and control over performing the behavior, perceived behavioral control may not contribute to intention. Ajzen and Fishbein (2005) further emphasized that "in some applications, one or another of the three predictions may be irrelevant and make no significant contributions to the prediction of intentions" (p.195).

The finding that intention to use EBCT teaching strategies had a direct effect on actual use is theoretically logical. Most research studies that have included testing this

relationship have drawn similar conclusions that the higher the intention the higher the likelihood that the behavior will be performed. This suggests that if nurse educators have a strong intention to use EBCT teaching strategies, they may be more inclined to use these strategies than if their intention to use is low.

Overall, the factors in the adjusted model fit the data set and depicted the theory's position of a significant direct positive effect of attitude on nurse educators' intention to use EBCT teaching strategies. Subjective norm was found to have a statistically significant direct weak negative effect on intention to use; and although perceived behavioral control did not emerge as a significant contributor influencing nurse educator's intention to use EBCT teaching strategies, the indirect effect through attitude may be considered. More precisely, the significant direct relationship between intention and actual use substantiated in the model validates the theoretical framework that intention is the most significant predictor of behavior (Ajzen, 1991; Ajzen & Madden, 1986). This study lends support to the theoretical framework, and brings new empirical evidence to the nursing education literature. In particular, the data can contribute to better understanding how attitude, subjective norm, and perceived behavioral control influence intention to use EBCT teaching strategies in this population of nurse educators, thus extending the application of the Theory of Planned Behavior.

Limitations of the Study

This study is limited in a number of ways. First, the adjusted model interpretation is limited to the data set in this study; and although the fit was found to be acceptable, there may be an alternative model that could better fit the data. Second, self-reporting about instructional habits was used that does not afford validation or cross-checking of information. Respondents may have answered the survey choosing “expected” answers. Third, a close-ended questionnaire limited the responses to the choices in the items. This method of data collection did not give the respondents the opportunity to offer additional information. Fourth, using the internet as the only source for data collection eliminated individuals who may not have access to a computer or other electronic device for completion of the questionnaire. Fifth, the distribution of the survey was limited to the institutions that granted approval within a set period of time, possibly eliminating potential participants who responded after the deadline date. Sixth, this study was limited to nursing faculty teaching in 4-year baccalaureate programs only, thereby excluding participants from other nursing program programs, two examples are associate degree and diploma nursing programs. Lastly, the study employed a cross-sectional correlation design that utilized the data gathered from specific items related to the constructs in this study for this population.

Recommendations

Following are three sections. The first addresses recommendations for practitioners, administrators and curriculum specialists/designers; the second highlights recommendations for program evaluators, policy makers, and accrediting bodies; the third suggests recommendations for future research and the fourth presents implications for nursing education.

Recommendations for Practitioners, Administrators, and Curriculum Designers

The specialized field of nursing education needs to continue to promote the importance of evidence-based practice in the delivery of instruction. This is especially important because the educational program lays the foundation of knowledge and serves as the springboard for nursing practice. Because nursing faculty shape the development of critical thinking skills through the types of instructional methods they employ (Davis 2013; Oja, 2011Wane & Lotz, 2013), the number of educators in this study who reported not having received any training in teaching critical thinking is an area of concern. Not only is there concern for the education system in meeting student learning outcomes, but also in the preparation of future nurses to deliver quality care. Nursing programs have reduced the curriculum content in an effort to shorten the length of time nurses spend achieving a master's degree. When in the past graduate nursing candidates were required to complete a minor one of which was education, this no longer holds true for many programs. Courses with educational content are virtually non-existent in most doctoral

programs. This is related to the emphasis on clinical content in graduate programs.

Therefore it is now time as the National League of Nursing recommends for all doctoral degree programs to have an education path for those nurses interested in pursuing academic practice.

Specifically, curriculum specialists who design educational preparation programs for nurse educators should include specific courses that address critical thinking such as ‘Critical Thinking Instruction’, as such will provide tools for effective decision-making and problem solving, teaching instructors how to develop courses that focus on fostering critical thinking skills in students, and also provide guidelines about how to teach students to think critically. There is a desperate call for better nurse education preparation in the area of critical thinking. One way in which this could be addressed is through the inclusion of graduate course work in critical thinking that may help prepare nurse educators to facilitate learning and fostering critical thinking development in nursing students.

Curriculum designers must keep abreast of changes within the health care system and ensure that the evidence-based principles that are required in nursing practice are mirrored with evidence-based instruction in the nursing curriculum. The end result can be the establishment of a collaborative network to support scholarly practice and education in an effort to maintain congruency between theory and practice. This action will help to establish professional connections to meet the ever-changing complex nature of health care delivery.

Additional training programs and support through faculty development sessions is needed to ensure continuity and focus of the importance of integrating evidence-based instructional methods for critical thinking in teaching nursing students. To encourage participation and action of implementing critical thinking teaching strategies, faculty development should be flexible and organized around faculty schedules. A few suggestions offered by Johnson-Taylor (2015) include offering online training, using departmental meetings for training, and visiting faculty in their offices for one-on-one training. To promote excellence in teaching, interactive sessions on topics such as “how learning works” and “learning principles for effective teaching” should be included in faculty development workshops for goal-directed teaching practice.

Incentives such as faculty awards, promotions, certificates, and stipends should be offered to faculty who integrate pedagogical skills for critical thinking development in nursing students. Free or reduced rate subscriptions to relevant nursing education and higher education journals such as “Journal of Nursing Education,” “Nursing Education in Practice,” Nursing Education Perspectives,” “Journal of Nursing Education and Practice,” and “Education World,” “Educational Leadership,” should be provided to nursing faculty to enhance teaching practice. Ideas from these journals should be shared at PLC sessions and adapted collaboratively to be used in the classroom and clinical setting.

In order to facilitate changes in instructional methods, it is important to envision what is ideal, acceptable or unacceptable. Information about faculty perceptions relating to changing or implementing critical thinking teaching strategies, should be gathered

using techniques such as, one-legged interviews and open-ended concern statements which address self-concerns, task concerns, and impact concerns. Hall and Hord (2011) concur by stating, “interventions to facilitate change must be aligned with the concerns of those who are engaged with the change” (p. 71). According to Hall and Hord (2011), innovation configuration (IC) maps should be used to capture the consensus of the change. IC maps can be used to map out what the changes in instructional delivery should look like, as well as track faculty progress in implementing new strategies for critical thinking.

Ambrose, Bridges, DiPietro, Lovett, & Norman (2010) outline the strategies that will ensure that teachers are addressing specific needs as they aim to foster critical thinking in nursing students. For example, nurse educators should be taught how to (a) assess students’ prior knowledge, such that objectives for teaching critical thinking could be identified; (b) inform students about specific goals for the course that in turn will help students to know the requirements for purposeful thinking; (c) use rubrics to inform students of the expectations for critical thinking performance; and (d) use the technique of scaffolding in patient care assignments, as the process of acquiring critical thinking skills requires initial instructor support and gradual withdrawal of support so the student develops his or her own ways of thinking. This focused training on how to facilitate critical thinking development in students is essential and would benefit all nurse educators especially those who may have transitioned to the educator role from a practice employment setting and may not have completed a specific educational program.

Administrators need to have an organized educational plan to meet the learning needs of all nursing faculty especially in the area of critical thinking development in nursing students. For example, administrators could establish transitional residency programs adapted from nursing residency programs and organize individualized programs to orient new nursing faculty to the teaching role. This program should be designed to meet the learning needs of each faculty member to enhance professional growth and development. This orientation and ongoing support is very important because nursing degrees that focus on practice have limited if any, educational courses integrated into the curriculum.

Once an educational plan is in place that is geared to assist nursing faculty, faculty evaluations should include assessments to determine how critical thinking skills are fostered in the classroom and clinical settings. In addition, administrators need to have a systematic plan to periodically assess nursing faculty's critical thinking skills to maintain overall teaching excellence and positive student outcomes. Administrators should also establish professional learning communities (PLC) as a means of facilitating a culture of change as nurse educators aim to improve teaching and learning. A PLC creates an environment where peers support peers and faculty can "visit each other's classrooms to review their teaching behavior" (Hall & Hord, 2011, p. 28). In a PLC according to Hall & Hord (2011), faculty will identify shared values and visions for student learning, study areas where students' performance fall below an acceptable

standard, and work collaboratively with administration to facilitate changes in instructional strategies.

An extension of this research into clinical practice to address deficits relating to critical thinking is essential. Ongoing educational programs should be established by health care institutions to cater to the learning needs nurses who may not have been trained in critical thinking skills development to manage the complex health care system. Although this study focuses on baccalaureate nurse educators, associate degree and diploma prepared nurses should be supported in the workplace and educational programs and given opportunities for professional growth. Proper coaching and support should be provided through a professional development program that will encourage collaborative learning and goal setting. During the professional development activities, opportunities should be given for discussion, demonstration, and practice related to critical thinking development in nursing practice.

Recommendations for Program Evaluators, Policy Makers, and Accreditation Bodies

The finding in this study that some nurse educators have “rarely” or “never” used the critical thinking teaching strategies that are evidence-based demands attention. Evidence-based nursing practice is the cutting edge of health care delivery and cannot be divorced from the avenue that prepares students to be nurses. If nursing students are to be adequately prepared for clinical practice, then program evaluators, policy makers and

accreditation bodies should specify standards and criteria for assessing the effectiveness of nursing education programs based on faculty pedagogical activities.

Expectations regarding faculty expertise in scholarship, teaching, service, and practice are usually left to the governing organization to establish and assess. Although accreditation standards address this to some extent, a more direct approach to have a standardized set of criteria for teaching expertise of all nurse educators that includes mandatory advancement in educational pedagogy should be a part of the formal program evaluation review system. When guidelines and criteria for assessment are established, nurse educators will be more inclined to integrate evidence-based teaching practice into their instructional portfolios. This requirement also mandates policy makers with the task of implementing program policies that address continued education in principles of teaching and learning.

Recommendations for Future Research

The main goal of research is to seek a clearer and broader understanding of relationships among constructs. More research is needed to understand the many factors influencing intention to use critical thinking strategies for instructing nursing students. For instance, factors such as curriculum design and mission and goals of the institution should be explored to determine the effect these may have on the types of instructional tools nurse educators use in the classroom and clinical settings. Also, background factors such as educational attainment level, years spent in nursing practice and length of

teaching, should be investigated to ascertain the degree of influence these elements may have on nurse educator teaching styles.

This study investigated the relationships of constructs based on a model patterned on one specific theory – TPB. Use of other theories such as Bandura’s Theory of Self Efficacy or curriculum ideologies such as learner-centered design should be explored to further examine reasons behind the choice of instructional techniques for critical thinking development in nursing education. A study investigating these elements would be beneficial to the field of nursing education and can help effect necessary change in curriculum design and pedagogy.

Future research can use a similar model approach and factor analysis procedures as in this study to explore the factors that influence nurse educators’ intention of using critical thinking teaching strategies in other geographical regions and in other nursing programs. Different sets of nurse educator populations should be used including those who teach in Associate Degree, Diploma, Registered nurse to Bachelor of Science in nursing, and Bachelor of Science in nursing to PhD programs. The effect of subjective norm, and perceived behavioral control on intention to use EBCT teaching strategies that were not fully supported in this study, warrant further investigation. This endeavor can bring more in-depth understanding of the relationship among the constructs in the TPB model and the application of the theory to educational research in nursing.

Based on the far reaching effect and connection between nursing education and nursing practice, further research using a longitudinal research design to examine the

factors that affect nurse educators' instructional behaviors should be undertaken. Also, qualitative studies examining factors that influence educators' perception and beliefs of the role of critical thinking in education and practice based on the three determinants of intention may be beneficial in further understanding the relationship between intention to use and actual use.

As an extension from the results on actual use of EBCT teaching strategies, changing the sample from nursing educators to nursing students could add pertinent information to the field of nursing education. Additional research focusing on student learning outcomes from the standpoint of specific teaching strategies, may help to shed new light on the relationship between types of methods and critical thinking performance.

Implications for Nursing Education

There is an urgent call for nurse educators to change instructional methods to incorporate evidence-based teaching techniques (Benner, 2015; Freed & McLaughlin, 2013; Glasgow et al., 2010; Spector & Odom, 2012; Tanner, 2010). Inclusion of annual faculty workshops that address evidence-based instructional techniques with emphasis on critical thinking development in nursing students will help keep the importance of critical thinking skill development relevant not only for success as a nursing student, but also for providing quality care to patients.

Nurse educators should plan to integrate critical thinking teaching methods that are evidence-based in their teaching. Such integration will ensure that students are exposed to scenarios in the classroom and clinical settings that will allow opportunities

for critical thinking skills to be practiced and developed. The call for transforming nursing education (IOM, 2011) continues, and nurse educators must adapt to the changes in health care delivery and design instruction to match the learning needs of a technologically hyped generation of learners. Gone are the days of a content saturated nursing curriculum, and a new era for instructional methods has emerged that must be embraced.

Focused attention should be given to establishing critical thinking competencies for students using testing platforms such as Assessment Technologies Institute (ATI) and Health Education Systems Incorporated (HESI) that offer assessments for critical thinking competence. Each student should be given the competencies to be achieved and guidelines about how to achieve them. Assessments for critical thinking ability should be conducted at each level as students progress in a nursing program. This provides a model for accountability and will help to increase awareness of the essential role critical thinking plays in nursing and in achieving positive patient care outcomes.

APPENDIX A

TABLE OF DEFINITIONS OF VARIABLES

Table of Definitions – Nurse educators’ intention to use evidence-based teaching strategies for critical thinking in baccalaureate nursing students

Table of Definitions of Variables

Variable (<i>the name that identifies the variable throughout the study</i>)	Conceptual Definition (<i>the specific definition used in the literature</i>)	Instrumental Definition (<i>items, stimulus, or indicators in the survey that will be used to observe the variable</i>) Intention to Use Questionnaire: <i>Questions</i>	Operational Definition (<i>the procedure to get one score or value for the variable</i>)
Ethnicity (ethni)	“The heritage, nationality group, lineage, or country of birth of a person or person’s parents or ancestors before their arrival in the United States” (US Census Bureau, 2000).	Demographic/Educator Characteristics: Please indicate the ethnic group with which you identify: White, Caucasian Asian, Asian American, Pacific Islander Black, African American Hispanic, Latino American Indian, Native American Other	This information was collected in the questionnaire as demographic data as part of the descriptive data and was recorded by percentage, mean and standard deviation. White, Caucasian = 1; Asian, Asian American, Pacific Islander = 2; Black, African American = 3; Hispanic, Latino = 4; American Indian, Native American = 5; Other = 6
Years of teaching nursing (yrs_tea)	The number of years a nurse educator has been actively involved in teaching nursing at the baccalaureate level.	Please indicate the number of years you have been teaching nursing: 1 to 2 years	This information was collected in the questionnaire as demographic data as part of the

		3 to 5 years 6 to 10 years 11 to 15 years More than 15 years	descriptive data and was recorded by percentage, mean and standard deviation. 1 to 2 years = 1 3 to 5 years = 2 6 to 10 years = 3 11 to 15 years = 4 More than 15 years = 5
Educational attainment level (edu_lvl)	“The highest level of education that an individual has completed” (US Census Bureau).	Please indicate the highest degree that you have obtained. Masters Doctorate	This information was collected in the questionnaire as demographic data as a part of the descriptive data and was recorded by percentage, mean and standard deviation. Masters = 1 Doctorate = 2
Training in teaching critical thinking (train_ct)	Any formal activity where information is shared about how to teach students to think critically.	Please indicate if you have received any training in teaching critical thinking Yes No	This information was collected in the questionnaire as demographic data as part of the descriptive data and was recorded by percentage, mean and standard deviation. Yes = 1 No = 0 The “Yes” answers will be summed.
Intention to use EBCT teaching strategies	Indications of how hard people are willing to try, of how much of an effort they are	<i>EBCT – evidence-based critical thinking</i>	Questionnaire items were scored from 1 to 5. Possible scores

(intention)	planning to exert in order to perform the behavior (Ajzen, 1991)	<p><i>Instructions:</i> Please answer each question to indicate the extent to which you agree or disagree with the following statements.</p> <p>Items have the following options: (1) Strongly disagree (SD); (2) Disagree (D); (3) Neither agree nor disagree (N); (4) Agree (A); (5) Strongly agree (SA).</p> <p>I will make an effort to use EBCT teaching strategies in my teaching repertoire for critical thinking development in nursing students this school year</p> <p>I intend to use EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students this school year</p> <p>I am aiming to use EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students this school year</p>	<p>are from 3 to 15.</p> <p>The questions relating to intention appeared as items 1, 10, and 14 on the survey. The mean was calculated for an overall intention score by adding scores for items 1, 10, and 14 and dividing by 3.</p> <p>Higher numbers would be associated with high intention to perform the behavior – using EBCT teaching strategies.</p>
Attitude toward using EBCT teaching strategies (attitude)	The degree to which a person perceives the behavior based on favorable or unfavorable assessment of the behavior (Ajzen, 1991)	<p>My using EBCT teaching strategies for critical thinking development in nursing students this school year is valuable.</p> <p>My using EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students is impossible.*</p> <p>For me, using EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students is a good idea.</p> <p>My using EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students is challenging.*</p>	<p>Questionnaire items were scored from 1 to 5. Possible scores are from 4 to 20.</p> <p>The questions relating to attitude appeared as items 2, 4, 13, and 17 on the survey. The mean was calculated for an overall attitude toward using EBCT teaching strategies score by adding the scores for items 2, 4, 13, and 17 and dividing by 4.</p> <p>* #'s 4 and 17 were reverse coded prior to performing the</p>

			<p>analysis</p> <p>Higher scores would be associated with a positive attitude towards intention to perform the targeted behavior – using EBCT teaching strategies. Lower scores would indicate a less positive attitude.</p>
<p>Subjective norm related using EBCT teaching strategies (subj_norm)</p>	<p>Any social influence that may determine if the individual performs or does not perform the behavior (Ajzen, 1991)</p>	<p>Most people who are important to me professionally think I should use EBCT teaching strategies for critical thinking development in nursing students.</p> <p>Students that I teach would approve my using EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students.</p> <p>My State Board of Nursing would approve my using EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students.</p> <p>Generally speaking, I do what most people who are important to me professionally think I should do.</p> <p>The accreditation agency for the nursing program in which I teach would approve my using EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students.</p> <p>It is expected of me that I use EBCT teaching strategies in my classroom/clinical rotation for critical development in nursing students.</p> <p>My administrators (president/dean/director/chair) would approve my using EBCT teaching strategies in</p>	<p>Questionnaire items were scored from 1 to 5. Possible scores are from 11 to 55.</p> <p>The questions relating to subjective norm appeared as items 3, 5, 9, 11, 15, 19, 20, 21, 23, 24 and 26 on the survey. The mean was calculated for an overall subjective norm score by adding the scores on items 3, 5, 9, 11, 15, 19, 20, 21, 23, 24 and 26 and dividing by 11.</p> <p>Higher scores would be associated with high social pressure/expectation related to intention to perform the behavior – using EBCT teaching strategies. Lower scores would indicate little or no social pressure/expectation.</p>

		<p>my classroom/clinical rotation to foster critical thinking in nursing students.</p> <p>I generally do what my administrators (president/dean/director/chair) expect me to do.</p> <p>Most of my nurse educator colleagues use EBCT teaching strategies for critical thinking development in nursing students.</p> <p>If I used EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students this year, most people who are important to me professionally would approve.</p> <p>Parents of the students I teach would approve my using EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students.</p>	
Perceived behavioral control influencing use of EBCT teaching strategies (perc_ctrl)	The level of confidence an individual has about their ability to perform the behavior based on how easy or difficult they perceive its performance as it relates to hindrances or facilitators. How much of the behavior is under the individual's control (Ajzen, 1991; Lee et al., 2010)	<p>I am confident that I can use EBCT teaching strategies in my classroom/clinical rotation this school year for critical thinking development in nursing students</p> <p>It will be entirely up to me whether or not I use EBCT teaching strategies in my classroom/clinical rotation this school year for critical thinking development in nursing students</p> <p>My using EBCT teaching strategies in my classroom/clinical rotation this school year for critical thinking development in nursing students would demand more planning time.*</p> <p>If I am required to prepare materials for activities that placed unanticipated demands on my time, it would make it more difficult for me to use EBCT teaching strategies</p>	<p>Questionnaire items were scored from 1 to 5. Possible scores are from 8 to 40.</p> <p>The questions relating to perceived behavioral control appeared as items 6, 7, 8, 12, 16, 18, 22, and 25 on the survey. The mean was calculated for an overall perceived behavior control score by adding the scores for items 6, 7, 8, 12, 16, 18, 22 and 25 and dividing by 8.</p> <p>* #'s 8, 12, 22 and 25 were reverse coded prior to performing the</p>

		<p>in my classroom/clinical rotation this school year for critical thinking development in nursing students. *</p> <p>I have the knowledge and ability to use EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students.</p> <p>If I wanted to, I could easily use EBCT teaching strategies in my classroom/clinical rotation this school year for critical thinking development in nursing students.</p> <p>If I am required to commit more time to faculty development opportunities related to critical thinking and instructional strategies, it would make it more difficult for me to use EBCT teaching strategies in my classroom/clinical rotation this school year for critical thinking development in nursing students .*</p> <p>If I am required to teach a certain amount of content material in a given class period, it would make it more difficult for me to cover content while implementing EBCT teaching strategies to foster critical thinking in nursing students.*</p>	<p>analysis</p> <p>Higher scores would be associated with high perception of ability to perform or have control over the behavior influencing intention to perform the behavior – using EBCT teaching strategies. Lower scores would indicate low perception of ability. The mean was calculated for an overall perceived behavior control score</p>
Actual use of EBCT teaching strategies (Targeted behavior) (act_use)	<p>Actual use of teaching methods that utilize best practices to stimulate thinking, reflection, and promote evaluation of various perspectives for knowledge acquisition (Winters & Echeverri, 2012).</p> <p>The justification, promotion, creation, and application of <i>teaching</i> methods that promote the preparation of nurses who are equipped to function in a constantly changing global health care environment</p>	<p><i>Instructions:</i> Please answer each of the following question by choosing the number that corresponds to the frequency of use.</p> <p>Items have the following options: (1) never; (2) rarely; (3) sometimes; (4) often; (5) always.</p> <p>How frequently do you use the following evidence-based critical thinking strategies in your classroom and/or clinical rotations to foster critical thinking in nursing students?</p> <p>Concept mapping Reflection papers Simulation</p>	<p>Questionnaire items were scored from 1 to 5. Possible scores are from 8 to 40.</p> <p>The questions relating to actual use appeared as items 27, 28, 29, 30, 31, 32, 33, and 34 on the survey. The mean was calculated for an overall actual use score by adding scores for items 27, 28, 29, 30, 31, 32, 33, and 34 and dividing by 8.</p>

	(Emerson & Records, 2008).	Role modeling Coaching Case studies Journaling Debating	Higher scores would be associated with frequent use of EBCT teaching strategies. Lower scores would indicate less frequent use.
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APPENDIX B

RESEARCH INSTRUMENT

Intention to Use Questionnaire

Demographic Information:

Please indicate the ethnic group with which you identify:

- ☐ White, Caucasian
☐ Asian, Asian American, Pacific Islander
☐ Black, African American
☐ Hispanic, Latino
☐ American Indian, Native American
☐ Other

Please indicate the number of years you have been teaching nursing:

- ☐ 1 to 2 years
☐ 3 to 5 years
☐ 6 to 10 years
☐ 11 – 15 years
☐ More than 15 years

Please indicate the highest degree that you have obtained.

- ☐ Masters
☐ Doctorate

Please indicate if you have received any training in teaching critical thinking

- ☐ Yes
☐ No

Instructions: Please answer each question to indicate the extent to which you agree or disagree with the following statements.

Strongly Disagree Disagree Neither Agree or Disagree Agree Strongly Agree
 1 2 3 4 5

1.	I will make an effort to use EBCT teaching strategies in my teaching repertoire for critical thinking development in nursing students this school year.	1	2	3	4	5
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2.	My using EBCT teaching strategies for critical thinking development in nursing students this school year is valuable.					
3.	Most people who are important to me professionally think I should use EBCT teaching strategies for critical thinking development in nursing students.					
4.	My using EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students is impossible.					
5.	Students that I teach would approve my using EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students.					
6.	I am confident that I can use EBCT teaching strategies in my classroom/clinical rotation this school year for critical thinking development in nursing students					
7.	It will be entirely up to me whether or not I use EBCT teaching strategies in my classroom/clinical rotation this school year for critical thinking development in nursing students					
8.	My using EBCT teaching strategies in my classroom/clinical rotation this school year for critical thinking development in nursing students would demand more planning time.					
9.	My State Board of Nursing would approve my using EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students.					
10.	I intend to use EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students this school year.					
11.	Generally speaking, I do what most people who are important to me professionally					

	think I should do.					
12.	If I am required to prepare materials for activities that placed unanticipated demands on my time, it would make it more difficult for me to use EBCT teaching strategies in my classroom/clinical rotation this school year for critical thinking development in nursing students.					
13.	For me, using EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students is a good idea.					
14.	I am aiming to use EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students this school year					
15.	The accreditation agency for the nursing program in which I teach would approve my using EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students.					
16.	I have the knowledge and ability to use EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students.					
17.	My using EBCT teaching strategies in my classroom/clinical rotation for critical thinking development in nursing students is challenging.					
18.	If I wanted to, I could easily use EBCT teaching strategies in my classroom/clinical rotation this school year for critical thinking development in nursing students					
19.	It is expected of me that I use EBCT teaching strategies in my classroom/clinical rotation for critical development in nursing students.					

20.	My administrators (president/dean/director/chair) would approve my using EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students.					
21.	I generally do what my administrators (president/dean/director/chair) expect me to do.					
22.	If I am required to commit more time to faculty development opportunities related to critical thinking and instructional strategies, it would make it more difficult for me to use EBCT teaching strategies in my classroom/clinical rotation this school year for critical thinking development in nursing students					
23.	Most of my nurse educator colleagues use EBCT teaching strategies for critical thinking development in nursing students.					
24.	If I used EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students this year, most people who are important to me professionally would approve.					
25.	If I am required to teach a certain amount of content material in a given class period, it would make it more difficult for me to cover content while implementing EBCT teaching strategies to foster critical thinking in nursing students.					
26.	Parents of the students I teach would approve my using EBCT teaching strategies in my classroom/clinical rotation to foster critical thinking in nursing students.					

Instructions: Please answer the following question to indicate how often you use CT strategies.

How frequently do you use the following evidence-based critical thinking strategies in your classroom and/or clinical rotations to foster critical thinking in nursing students?

Never
1

Rarely
2

Sometimes
3

Often
4

Always
5

27.	Concept mapping	1	2	3	4	5
28.	Reflection activities					
29.	Simulation					
30.	Role modeling					
31.	Coaching					
32.	Case studies					
33.	Journaling					
34.	Debating					

APPENDIX C
INFORMED CONSENT

Informed Consent Form

Topic: Nurse educators' intention to use evidence-based teaching strategies for critical thinking in baccalaureate nursing students.

Researcher: Angerlita Y Smith (Doctoral Student at Andrews University)

Research Supervisor: Dr. Raymond Ostrander E-mail: rjo@andrews.edu

Contact Information: E-mail: angerlit@andrews.edu Phone: (256) 683-6247

You are invited to take part in a research study relating to evidence-based teaching strategies in nursing education.

What the study is about: This study is designed to seek a better understanding of nurse educators' intentional effort to use evidence-based critical thinking teaching strategies to foster critical thinking in nursing students.

What you will be asked to do: As a participant, you will be asked to complete a questionnaire which will require you to respond indicating your intention to use evidence-based teaching strategies, and actual use of specific instructional methods for critical thinking.

Risks and Benefits: There are no known risks or cause for distress associated with this study. Potential benefits of the proposed study for nursing education and practice include results that will add valuable knowledge about the integration of evidence-based critical thinking teaching strategies in the nursing curriculum with implications for focused nurse educator professional development. To you the participant, the results will provide insight about the factors that may influence instructional activity related to evidence-based teaching strategies and may serve to enact necessary change for didactic and clinical learning experiences.

Participation: Taking part in this study is strictly voluntary. If you do not wish to participate in the study, or decide to withdraw at any time, no penalty or loss will be

applied to you. Your consent to participate in this study will be implied when you decide to complete the questionnaire. The questionnaire will take approximately 10 minutes to complete.

Confidentiality: The records of this study will be kept private in a secure location. An encrypted security measure will be embedded into the online survey questionnaire so no identifiable information relating to you will be associated with your answers on the questionnaire. The data will only be reviewed by the researcher, the research supervisor and methodologist. Only aggregated data will be published without any means of tracing the data to any specific school or individual. The data will be kept for one (1) year and completely destroyed by deleting all files from the researcher's computer.

Questions: You may contact the researcher or the research supervisor using the information at the top of this form if you should have any questions about the study.

Statement of Consent: By clicking on the survey link below, you agree to the following statement: I have read the above information and have received clarification as needed. I consent to take part in the research study relating to nurse educator intention to use evidence-based critical thinking teaching strategies.

Do you agree to the Statement of Consent?

☐ Yes ☐ No

APPENDIX D

LETTERS

Dear IRB Chair/Director,

My name is Angerlita Y. Smith. I would like to know what the IRB procedures are for conducting research at your institution. I developed a research proposal for my doctoral dissertation at Andrews University entitled “Nurse Educators’ Intention to use Evidence-based Teaching Strategies for Critical Thinking in Baccalaureate Nursing Students”. The aim is to gain a better understanding of nurse educators’ intention to use evidence-based critical thinking strategies for critical thinking development in nursing students.

I have attached my IRB approval from Andrews University along with my IRB application for your review.

Participants (nursing faculty) will be asked to complete an online survey which will be sent to them via email. My survey does not ask for any personally identifying information and the study participant’s identification will be completely anonymous. There will also be no tracing of the information to any particular institution and the results will be reported in an aggregated format.

The items on the survey will seek information about factors that may influence use of evidence-based critical thinking teaching strategies such as attitude, perception of others’ expectation to use evidence-based teaching strategies, and confidence, ability, enhancers, and barriers relating to use of evidence-based teaching strategies for critical thinking. The survey is expected to take approximately 10 minutes or less to complete. There is no risk or harm associated with this research study.

After receiving permission from you, I will make an initial ‘contact of interest’ with the dean/chair/director of your nursing program. The intent of the initial contact with these individuals is to inform of the possibility of conducting research with nursing faculty and seek permission to distribute the online survey.

If you are not the individual in charge of the IRB committee, I would very much appreciate if you would forward the name and contact information of the person with whom I should communicate. I would be happy to provide any further information you may require.

Please let me know the protocol for conducting this research at your institution at your earliest convenience.

Thank you for your time.

Sincerely,

Angerlita Y. Smith, EdD(c), MSN, RN
(256) 683-6247 angerlit@andrews.edu

Dear Nurse Educator,

A Letter of Invitation:

My name is Angerlita Y. Smith. I am a doctoral candidate at Andrews University. My doctoral dissertation is entitled “**Nurse Educators’ Intention to use Evidence-based Teaching Strategies for Critical Thinking in Baccalaureate Nursing Students**”. For my scholarly project, I am conducting an online survey in an effort to gain a better understanding of nurse educators’ intention to use evidence-based critical thinking strategies for critical thinking development in nursing students.

This is an invitation seeking your participating in this research study by responding to the online survey entitled “The use of evidence-based teaching strategies in nursing education”. The survey can be completed in approximately 10 minutes or less. This study has been approved by the Institutional Review Board at Andrews University.

EBCT is the abbreviation used for evidence-based critical thinking in this research. This involves application of *teaching* methods such as concept mapping, reflection, simulation, coaching, case studies, role modeling, and journaling that promote the preparation of nurses who are equipped to function in a constantly changing global health care environment

Your participation would be greatly appreciated.

Participation is strictly voluntary. Pertinent information which includes the purpose and benefits of the study can be found in the consent form at the beginning of the survey. At the end of the consent form, you will be asked to confirm your agreement to participate. Your consent will be implied once you agree to participate in the survey.

All responses to the survey are anonymous and confidential. You will not be asked to supply any personally identifying information or place of employment. Data will be reported in aggregate format so no individual participant or organization will be identified.

I greatly appreciate your time and willingness to assist me in gathering information relevant to this research study. Please follow the link below to gain access to the consent form and online survey.

Link

This link will be open until (Date).

If you have questions or concerns about the research study, please do not hesitate to contact me by phone (256) 683-6247, or by email at angerlit@andrews.edu. You may also contact my Dissertation Chair, Dr. Raymond Ostrander at rjo@andrews.edu.

Thank you for your time and consideration of participation.

Sincerely,

Angerlita Y. Smith, EdD(c), MSN, RN
(256) 683-6247 angerlit@andrews.edu

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